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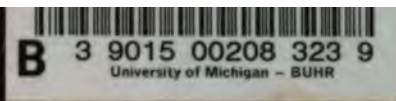
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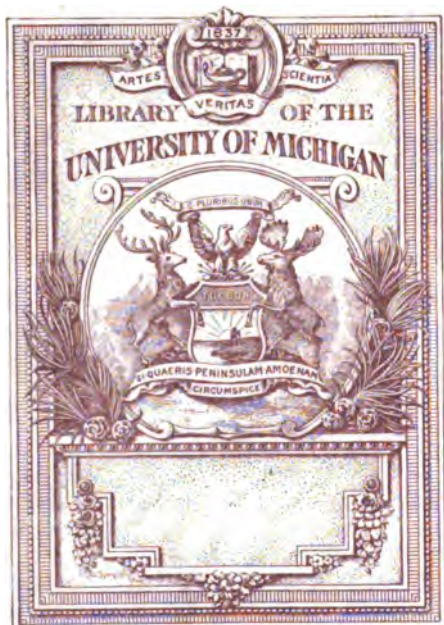
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INTERNATIONAL CLINICS:

A QUARTERLY OF CLINICAL LECTURES

ON

MEDICINE, NEUROLOGY, PEDIATRICS, SURGERY,
GENITO-URINARY SURGERY, GYNÆCOLOGY,
OBSTETRICS, OPHTHALMOLOGY, LARYNGOLOGY,
OTOLOGY, AND DERMATOLOGY,

BY

PROFESSORS AND LECTURERS IN THE LEADING MEDICAL
COLLEGES OF THE UNITED STATES, FRANCE,
GREAT BRITAIN, AND CANADA.

EDITED BY

JUDSON DALAND, M.D., PHILADELPHIA,

*Instructor in Clinical Medicine and Lecturer on Physical Diagnosis in the University of Pennsylvania;
Assistant Physician to the Hospital of the University of Pennsylvania; Physician to the
Philadelphia Hospital and to the Rush Hospital for Consumptives.*

J. MITCHELL BRUCE, M.D., F.R.C.P., LONDON, ENGLAND,

Physician and Lecturer on Therapeutics at the Charing Cross Hospital.

DAVID W. FINLAY, M.D., F.R.C.P., ABERDEEN, SCOTLAND,

*Professor of Practice of Medicine in the University of Aberdeen; Physician to, and Lecturer on Clinical
Medicine in, the Aberdeen Royal Infirmary; Consulting Physician to the Royal
Hospital for Diseases of the Chest, London.*

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CONTRIBUTORS TO VOLUME I.

(FOURTH SERIES.)

Anders, J. M., M.D., Ph.D., Professor of Practice in the Medico-Chirurgical College; Visiting Physician to the Philadelphia Hospital, etc.

Ashton, William Easterly, M.D., Professor of Gynæcology in the Medico-Chirurgical College of Philadelphia; Gynæcologist to the Medico-Chirurgical and Philadelphia Hospitals.

Baker, Albert Rufus, M.D., Professor of Diseases of the Eye, Ear, and Throat in the Medical Department of the University of Wooster, Cleveland, Ohio.

Barling, Gilbert, F.R.C.S., Professor of Surgery in Mason College, England.

Booth, J. Mackenzie, M.A., M.D., C.M. (Aberdeen), Surgeon and Lecturer on Clinical Surgery at the Aberdeen Royal Infirmary; Lecturer on Diseases of the Ear and Larynx in the University of Aberdeen.

Brower, Daniel R., M.D., Professor of Mental Diseases, Materia Medica, and Therapeutics, Rush Medical College; Professor of Diseases of the Nervous System, Woman's Medical College; Professor of Diseases of the Nervous System, Post-Graduate School, etc., Chicago.

Bryant, Joseph D., M.D., Professor of Anatomy and Clinical Surgery and Associate Professor of Orthopædic Surgery in the Bellevue Hospital Medical College, New York City, New York.

Byford, Henry T., M.D., Professor of Gynæcology, College of Physicians and Surgeons, Chicago; Professor of Gynæcology, Chicago Post-Graduate Medical School; Professor of Clinical Gynæcology, Northwestern University Woman's Medical School; Gynæcologist to St. Luke's Hospital; Surgeon at the Woman's Hospital at Chicago.

Chapin, Henry Dwight, M.D., Professor of the Diseases of Children at the New York Post-Graduate Medical School and Hospital; Attending Physician to Demilt Dispensary, New York City, New York.

Cohen, Solomon Solis, M.D., Physician to the Philadelphia Hospital; Professor of Clinical Medicine and Therapeutics in the Philadelphia Polyclinic, etc.

Dejérine, Professor, Physician to the Hospice de Bicêtre; Professor (Agrégré) in the Paris Medical School.

Dunn, James H., M.D., Professor of Genito-Urinary Surgery in the Medical Department of the University of Minnesota; Surgeon to St. Mary's and Asbury Hospitals, Minneapolis, Minnesota.

Gaston, J. McFadden, M.D., Professor of the Principles and Practice of Surgery, Southern Medical College, Atlanta.

Hare, Hobart A., M.D., Professor of Therapeutics and *Materia Medica* in the Jefferson Medical College of Philadelphia.

Haward, Warrington, F.R.C.S. Eng., Surgeon to and Lecturer on Clinical Surgery at St. George's Hospital, etc.

Heckel, Edward B., A.M., M.D., Lecturer on Ophthalmology and Otology at the Western Pennsylvania Medical College; Oculist and Aurist to the J. M. Gusky Orphanage and Home for the Aged of Western Pennsylvania, and the Home of the Friendless, Pittsburgh.

Horwitz, Orville, B.S., M.D., Clinical Professor of Genito-Urinary Diseases in Jefferson Medical College; Surgeon to the Philadelphia Hospital, etc.

Humphrys, Sir George Murray, F.R.S., M.D., LL.D., Sc.D., F.R.C.S.E., Professor of Surgery in the University of Cambridge, and Surgeon to Addenbrooke's Hospital.

Jackson, George Thomas, M.D., Professor of Dermatology at the Woman's Medical College of the New York Infirmary.

Jones, S. J., M.D., LL.D., Professor of Ophthalmology and Otology in Northwestern University Medical School (Chicago Medical College), Chicago.

Lydston, G. Frank, M.D., Professor of the Surgical Diseases of the Genito-Urinary Organs and Syphilology in the Chicago College of Physicians and Surgeons; Fellow of the Chicago Academy of Medicine, etc.

Mann, Matthew D., A.M., M.D., Professor of Obstetrics and Gynæcology, University of Buffalo; Attending Gynæcologist to the Buffalo General Hospital.

McGuire, Hunter, M.D., LL.D., Professor of Clinical Surgery in the University College of Medicine, Richmond, Virginia.

Mills, Charles K., M.D., Professor of Mental Diseases and of Medical Jurisprudence in the University of Pennsylvania; Neurologist to the Philadelphia Hospital.

Mundé, Paul F., M.D., Professor of Gynæcology in the New York Polyclinic.

Park, Roswell, A.M., M.D., Professor of Surgery in the University of Buffalo.

Patton, Joseph M., M.D., Professor of Clinical Medicine in the Chicago Polyclinic, etc.

Pershing, Howell T., M.Sc., M.D., Professor of Nervous and Mental Diseases in the University of Denver; Neurologist to St. Luke's Hospital and St. Joseph's Hospital; Alienist to the Arapahoe County Hospital.

Pooley, Thomas R., M.D., Professor of Ophthalmology in the New York Polyclinic; Surgeon-in-Chief to the New Amsterdam Eye and Ear Hospital.

Roberts, A. M., M.D., Professor of Surgery in the Woman's Medical College of Pennsylvania.

Rockwell, A. D., A.M., M.D., formerly Professor of Electro-Therapeutics in the New York Post-Graduate Medical School, and Electro-Therapeutist to the New York State Woman's Hospital.

Sansom, A. Ernest, M.D., F.R.C.P., Physician to the London Hospital; Consulting Physician and Vice-President of the Northeastern Hospital for Children.

Sayre, Lewis A., M.D., Professor of Orthopædic Surgery in the Bellevue Hospital Medical College, New York.

Schweinitz, G. E. de, M.D., Clinical Professor of Ophthalmology in the Jefferson Medical College; Professor of Ophthalmology in the Philadelphia Polyclinic; Ophthalmic Surgeon to the Philadelphia Hospital.

Skene, Alexander J. C., M.D., Professor of Gynecology, Long Island College Hospital, and Dean of the Faculty.

Snell, Simeon, F.R.C.S. Ed., Ophthalmic Surgeon to the Sheffield General Infirmary; Lecturer on Diseases of the Eye at the Sheffield School of Medicine; Consulting Ophthalmic Surgeon to the Rotherham Hospital.

Starr, M. Allen, M.D., Professor of Diseases of the Mind and Nervous System, College of Physicians and Surgeons, New York.

Stockton, Charles G., M.D., Professor of Medicine at the University of Buffalo; Attending Physician, Buffalo General Hospital.

Sutton, J. Bland, M.D., Assistant Surgeon, Middlesex Hospital, London.

Von Noorden, Professor Carl, M.D., Berlin, Germany.

White, W. Hale, M.D., F.R.C.P., Physician to Guy's Hospital, London.

Wilson, H. Augustus, M.D., Clinical Professor of Orthopædic Surgery in the Jefferson Medical College and in the Woman's Medical College; Professor of General and Orthopædic Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine, etc.

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JEAN-MARIE CHARCOT.

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By P. A. J. S. MARSH, M.A.

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There are several advantages to this approach. First, it is a relatively straightforward method to implement. Second, it allows for the use of a wide range of loss functions, including the squared loss, the absolute loss, and the Huber loss. Third, it is a robust method, meaning that it is not overly sensitive to outliers in the data.

Therefore, the independent variable of the study is the level of perceived social support, which is expected to significantly predict the level of perceived social support. The dependent variable is the level of perceived social support, which is expected to be significantly predicted by the independent variable. The study is a quantitative study, and the data will be analyzed using statistical methods. The study is a quantitative study, and the data will be analyzed using statistical methods. The study is a quantitative study, and the data will be analyzed using statistical methods.

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Memorial of

PROFESSOR JEAN-MARIE CHARCOT.¹

BY M. ALLEN STARR, M.D., Ph.D.

By the death of Professor Charcot, which occurred on the 16th of August, 1893, the science of medicine has suffered the loss of its most accomplished and foremost clinical teacher, one whose wonderful power of instruction was recognized over the entire world; one who will be personally regretted by devoted pupils in every land.

It is fitting, therefore, that in this volume of the **INTERNATIONAL CLINICS** the place of honor should be given to some account of his life and of his work. Such a memorial will be welcome to his numerous admirers, and of interest to those who had no personal knowledge of him. It may also be a source of inspiration to those who, like him, are laboring in the field of clinical medicine.

Charcot was born in Paris on the 29th of November, 1825. He was the son of a wagon-maker, a man of such limited means that he was not able to give all his children an education. Jean-Marie, however, showed so much ability in school that he was selected from among his brothers as the most promising member of the family, and, while one brother was enlisted as a soldier and another put to work in the father's shop, he was allowed to enter the Lycée St.-Louis, at that time the best academy in Paris. After his preliminary education was completed there, the choice of the medical profession was made with some hesitation, for the inclination of the young man was for the life of an artist, and his ambition in this direction had been increased by a journey to Italy and a residence there of several months. This love of art persisted in after-life, as was well known to those who visited his home of late years, where he had gathered many treasures of art, among which were a variety of paintings in oil and on porcelain from his own hand. It was probably the lack of means that

¹ Read in part before the New York Neurological Society, October 8, 1893, and published in the *Medical News*, October 14, 1893.

finally determined him to take up medicine. After passing through the medical school and serving as an interne in La Salpêtrière,—an almshouse for old women, then almost unknown, but later to become famous as the theatre of his wonderful activity,—he took his doctorate degree in 1853.

For the next three years he served as chief of the medical clinic in the medical school, supporting himself meantime by giving private tuition. He was then appointed physician to the Central Bureau of Paris, with a moderate salary, his duties being to examine applicants for the hospitals and assign them to the proper services. While filling these positions and slowly making his way, he was not idle, but was preparing for that competitive examination to which ambition for success leads every young physician in Paris.

It is to be remembered that hospital appointments in France are under governmental control, and that as fast as vacancies upon the attending staff of hospitals occur, they are filled by the appointment of men who have qualified themselves for these positions by passing a very rigid examination, by presenting theses, and on occasion defending in public debate the positions taken in the theses. Charcot succeeded in passing this examination in 1860, at his second trial, and it is said that he always supposed that he owed his success to his ability in defending the points made in his thesis upon chronic ulcerative pneumonia, which were ruthlessly questioned and criticised by his examiners. One of his biographers states that it was the wonderful familiarity with the literature of his subject which really impressed the examiners, who were amazed at the long bibliography attached to his thesis. In this respect it may be noticed that his articles always excelled those of other French writers, Charcot never ignoring, as they do, the work done by other men in other lands.

Having qualified for a position as attending physician to a hospital, Charcot was able to select in 1862 the service at his old hospital, La Salpêtrière. He found a large number of old people collected together in this poor-house, and among them many with chronic incurable diseases. He had opportunities to watch the progress of disease, both acute and chronic, in old age, and, most important of all, he had unlimited pathological material to supplement his clinical observations. It is to this latter fact that he owed the beginning of his reputation.

In 1872, Charcot was made Professor of Pathological Anatomy in the Faculty of Medicine in Paris, the highest prize in the French medical world. He succeeded Vulpian in this professorship. For the ten following years he held this position, contributing during that

time many important observations upon diseases of the lungs, liver, kidneys, and other organs, meanwhile, however, not neglecting his lectures at the Salpêtrière upon diseases of the nervous system. It was these latter that were his favorite studies, and it was in this department that his work brought renown to himself and to France.

In 1882 this fact was officially recognized by the French government, under the leadership of Gambetta,—a personal friend of Charcot,—by the foundation in the Medical School of a Professorship of Nervous Diseases, and Charcot's appointment to it, with the establishment of a public clinique at La Salpêtrière. From that time until his death his annual courses of lectures were attended by students of medicine from every land, and it may truly be said that there are few teachers of eminence at present living who have not drawn inspiration from his model clinics.

It was in the spring of 1883 that I had the good fortune to be numbered among his students, and it may be of interest if I relate some details of his work. On three mornings of the week, at half-past nine o'clock promptly, he would come to the dispensary of the hospital and seat himself behind a little railing, which separated him on one side from the patients, and on the other from the crowd of students, many of them foreigners, and all graduates in medicine. His assistants would then bring the patients, one by one, from the adjoining waiting-room. A concise history would be given of the case. Then Charcot would ask some searching questions, would elicit some unexpected symptom, would discover some physical appearance that others had not noticed, would examine the patient himself if there was any special point of interest, and then would quickly state his diagnosis, supporting the position taken, or discuss the probabilities or difficulties of diagnosis, often with interesting comments or some reference to the literature, and finishing occasionally with some therapeutic suggestion.

On Tuesdays the public clinic of the week was held in a large building just within the hospital gate. The room was arranged with a stage and footlights, and tiers of seats arose from the front level to quite a height at the rear of the room. As many as six hundred students could be seated, and the place was always full. After the audience had gathered, dark shutters were closed at the windows, the footlights were turned up, and the clinic began. Charcot, attended by a number of his assistants, entered and seated himself on one side of the stage, at a little table, looking not at his audience, but across the stage. Then the patient or patients, for he usually showed a number

at once, either to display variations of one disease or to draw contrasts with other diseases, were placed before the footlights, and sometimes, when a particular feature had to be demonstrated, a calcium light was turned on the patient, whose figure, the chief point of light in the darkness, could always be perfectly seen by all. In a distinct but not loud voice, with a slowness of speech that led to a clear understanding,—especially by the foreign element in his audience,—Charcot would describe the case, call attention to special symptoms, show the peculiarities of spasm or deformity or tremor or gait, compare them with other similar forms for the purpose of differentiation, and sum up the diagnosis. Then, dismissing the patient, he would begin to describe the lesion, and at once on the screen at the opposite side of the stage the magic lantern would flash out the picture he wished to show, either in the form of a sketch made from nature, or an actual slide of a section of the spinal cord, or a part of the brain magnified by the microscope, or a photograph of some unusual clinical type of the disease in question. Thus, symptomatology, diagnosis, and pathology were presented in orderly succession in a manner most clear and forcible, and with an effect that was most instructive and impressive. It has been said that the whole clinic was arranged for theatrical effect. I believe that it was the only manner in which it was possible to demonstrate in a clear light to the large audience all the features, clinical and pathological, of the subject. But grant that it was theatrical: it left on the mind of the student a series of mental pictures of patients and of lesions which no amount of private study could possibly produce. It taught men so that they could not fail to remember; and what higher result can a teacher wish? And the students appreciated it. They gathered enthusiasm from Charcot's evident earnestness. No teacher has ever had such a constant company of devoted young men about him, eager to share in his studies, to be directed in their investigations, to be considered a part of his working force. He had the faculty of engaging their interest, of stimulating their investigations, of directing their work. He supplied them with material and showed them how to use it. As a result, there have appeared in France during the past fifteen years an enormous number of clinical and pathological researches in the department of neurology, all of them inspired by Charcot, though carried out by some one of his pupils. He built up the school of the Salpêtrière. One can hardly name a young man of eminence in medicine in France to-day who has not at some time been glad to call himself a pupil of Charcot. And when, in addition to the long list of his own articles,—his collected works will fill fifteen large volumes,—the

articles are collected on which his name appears as collaborator, there is presented a mass of medical literature far surpassing that of any other medical school in the world.

Bourneville has said that Charcot was not fond of writing or of publication, that it required two years of constant urging to induce him to publish the first two volumes of his lectures, and that he never would have given to the world many of his articles had not some one of his assistants attended to the details of publication. Gilles de la Tourette says that of late years all of Charcot's clinical lectures were carefully prepared in writing, so that at the close of the lecture he merely handed his notes to one of the assistants, who was then able to arrange them with the histories of the cases for publication. Those who have followed these clinical lectures in the *Progrès Médical* during the past ten years know what a wealth of information they contain.

It would take too much time to specify his various books, lectures, and articles published between 1865 and 1892. I cannot, however, omit to mention his "Localisations des Maladies Cérébrales" and his "Localisations des Maladies de la Moelle épinière," which did much to establish on a firm basis the doctrine of the localization of cerebral and spinal functions, and which appeared in the *Revue de Médecine* in 1879, and his numerous valuable papers on the pathology of spinal lesions. To him we owe the discovery of amyotrophic lateral sclerosis, which has been called Charcot's disease. It should also be known that, with Vulpian and Brown-Séquard, he founded the *Archives de Physiologie* in 1869, the *Progrès Médical* in 1873, the *Revue mensuelle de Médecine et de Chirurgie* in 1877, now known as the *Revue de Médecine*, the *Archives de Neurologie* in 1880, and the *Nouvelle Iconographie de la Salpêtrière* in 1888. To all these he continued to contribute from time to time until his death. It is said that the sale of his three volumes of lectures published from 1872 to 1880 surpassed that of any other medical work ever published. These lectures have been translated into German, English, Spanish, Italian, Hungarian, and Russian, and new editions are demanded every year.

Public recognition of his abilities and eminence was not wanting. He had been president of all the chief medical societies in Paris, and was a corresponding member of numerous societies in every city on the continent of Europe, of the New York Academy of Medicine, of the New York Neurological Society, and of the College of Physicians of Philadelphia. He was made a member of the Institute of France in 1883, and Commander of the Legion of Honor in 1892. It may be justly said that France honored herself by conferring honors upon him,

for there are few Frenchmen who, during the past quarter-century, have done as much as he to support the waning French authority in matters of science or to preserve the fading reputation of the French school of medicine. Not medicine alone, but French prestige as well, has reason to regret his untimely demise.

It remains to allude to his personal characteristics. Charcot was a man of great dignity, of calm repose, of even temper, of slow thought and utterance, but of much reserve power. In appearance like Napoleon, and in manner reserved and observant, he was not the type of man to be popular. Yet his dignity was one that was felt to be appropriate to a man of great power, and was never assumed. With patients suffering from trifling affections he showed no sympathy, possibly little interest. With patients whose diseases were grave, or obscure, or of rare type, he was kind, attentive, interested, and was ready to spend valuable time in most careful investigation. Of this I am assured by patients who had been under his care, and who would never have come away with such kindly feeling had they not experienced thoughtful attention at his hands. His relation to his pupils was also one of mutual interest and affection. He was never familiar with them, yet he always respected and sought their opinions, was never autocratic in the direction of their work, and was always the subject of their devoted admiration and respect.

Without characteristics of many kinds of the noblest type, no man could have kept about him such a number of able medical workers, all loyal to him in the midst of their labors.

His domestic life was a delightful one. He was married early in life to a lady of considerable wealth, who was enthusiastic in his work, and by whose aid many scientific undertakings, otherwise impossible, were carried out. He had two children, one a boy, whom it was his fond desire to see succeeding as a physician, and who gives promise of being worthy of the name. Their homes—he had a large country place at Neuilly, as well as a fine mansion on the Boulevard St.-Germain—were superb in every appointment, and contained many treasures of art; for the artistic sense was one which he delighted to indulge. He was a designer, a painter on porcelain and in oils. The tiles in his study mantel and the ceiling of one of his salons were painted by his own hand. Many of the drawings displayed at his lectures and published in his books were made by himself. He delighted in gathering about him curios of every kind. He cared less for music than for painting, and always preferred the classic and Italian schools to Wagner, showing himself thoroughly French in this respect. His house

was open every Monday evening to his friends and pupils, and a considerable company was always glad to gather about him to enjoy his hospitality and to profit by the interesting discussions which went on.

Like every man of eminence, Charcot had his enemies, critics in science, rivals in medicine. Yet, after all their criticism is exhausted, we must admit that Charcot remains the greatest French physician since Trousseau, the greatest ornament of the medical profession of the present age. We admire his genius; we esteem his scientific work; we respect him as the greatest of medical teachers; we honor him as a noble, unselfish, and truly great man.

Medicine.

THE TREATMENT OF RHEUMATISM.

CLINICAL LECTURE DELIVERED AT THE LONDON HOSPITAL.

BY A. ERNEST SANSOM, M.D., F.R.C.P.,

Physician to the London Hospital; Consulting Physician and Vice-President of the
Northeastern Hospital for Children.

GENTLEMEN,—We come to the practical question, How shall we treat our patient who is suffering from rheumatism in its various phases as you have observed them in these wards? We have endeavored from our experiences to draw a clear picture of rheumatism in its clinical aspects, and I think we shall have little difficulty in differentiating our patients,—the rheumatic from the non-rheumatic. We have considered the outlines of the disease (see *The Clinical Journal*, December 7, 1892, p. 81, and *Allgemeine Wiener Medizinische Zeitung*, 7 Februar, 1893, p. 57). We have also discussed some painful affections of the joints which are *not* rheumatic (see *International Clinics*, vol. i., third series, 1893, p. 58). We may thus summarize our views. Rheumatism is a morbid process, whose manifestations are chiefly in the serous membranes of the joints (attended with pain), in the pericardium (usually attended with symptoms of distress and pain), in the endocardium (not attended with pain), in the pleura, and sometimes in the fibrous tissues in various situations (rheumatic nodules). The disease is usually accompanied at some periods of its course by a moderate fever; exceptionally it has such an effect upon the cerebro-spinal nervous system as to cause excessive fever (hyperpyrexia); in the majority of cases there is sweating, and in some there are eruptions upon the skin. It is especially a disease of the early periods of life; it may occur in the form of endocarditis, in the foetus even when the mother shows no rheumatic manifestations, and many of the congenital affections of the heart may be ascribed to the morbid changes which it has produced. It is very rarely manifested *for the first time* after the age of thirty-five. The course of the morbid processes is very protracted, and there are often explosive outbreaks

which may be determined by very slight or undiscoverable causes: these outbreaks are often miscalled "relapses." Dr. Cheadle has well said that "the history of a rheumatism may be the history of a whole childhood" (see Keating's "Cyclopædia of the Diseases of Children," vol. i. p. 786), but I would go further and say, not of a childhood only, but also of an early adult life. It is by no means limited to or traceable by its obvious signs and symptoms, objective and subjective, as it is liable, especially in the later years of adult life, to be modified by the disturbing influences of independent morbid complications.

The *painful* manifestations of rheumatism are those which chiefly fix themselves upon the mind, especially those of the joints. We must, however, in discussing treatment, disabuse ourselves of the wide-spread fallacy that all painful affections of the joints are rheumatic. I have shown you that there are many causes of non-rheumatic arthritis. Inflammations of the joints may be observed in cases of blood-deterioration and blood-extravasation (in scurvy, purpura, and hæmophilia), in certain infective diseases (syphilis, septicæmia, dysentery, enteric fever, mumps, gonorrhœa, influenza, and scarlatina), in a disease of perverted metamorphosis (gout), and lastly in the affection known as osteo-arthritis. It is this last-named disorder which I believe to influence in the highest degree our success in the treatment of articular rheumatism, for it is one of the most frequent of complications. At any rate, I feel convinced that we often meet with "mixed" cases,—that a non-rheumatic may reinforce a rheumatic arthritis.

Intelligent treatment must be dominated by theory. The principles which seem to be justified by our experience are these: that the pathogeny of rheumatism is chiefly and essentially humoral; that the disease is due to a disturbance of metabolism, whereby certain undetermined poisons or toxins are elaborated, which continue for long periods to induce morbid changes chiefly in the serous membrane and fibrous tissues, causing the phenomena which we have considered; that the pathogeny of osteo-arthritis, which not infrequently complicates rheumatism, is essentially nervous; that the central cerebro-spinal affection causes a disturbance of nutrition and a severe inflammation in a joint in a manner analogous to though different from that which occurs in tabes dorsalis, and that the associations of this disease are with other disorders of the central nervous system.

I would not contend that the influence of the nervous system is to be ignored in the pathogenesis of either form, but in the former such an influence is primarily manifested in disturbing the processes

of metabolism, whilst in the latter metabolism is not necessarily disturbed at all, but the direct effect of the central nervous disorder is upon the trophic nerve-mechanism of the joint or joints.

With regard to the treatment of rheumatism, I think that the plan best adapted for practical usefulness will be for me to place before you some supposititious cases which may be taken as types of certain groups.

CASE A.—We will assume that a child nine or ten years of age is brought in with a report from those in charge of him that he is in pain when he moves; that he has cried because of pain in his knee-joints, which are found to be slightly swollen and tender on manipulation. His temperature is 102° F. His throat shows no signs of recent inflammation. Our physical examination reveals nothing wrong with the heart or with other internal organs.

Change the surroundings for a moment. Imagine that you are called to a case like this in one of the homes of the poor, where none of the appliances of the hospital are at hand, and where the direction of all the stages of treatment and nursing devolves upon yourself. You order that the child shall have his clothing removed by gentle hands (so that the joints be not pained) and be put to bed. The sheet should be taken away, so that the blankets be next the skin. The child being now without clothing, you are enabled to make, with all gentleness, a better examination of the joints. You will direct the mother or nurse to place another folded blanket under the child and sponge and cleanse the whole surface of the body with soap and warm water. After the sponging and cleansing and gentle drying with a well-warmed towel, the folded blanket will be removed, a warm night-dress put on, and the child left comfortable between the blankets of the bed. If any of the joints remain so painful as to cause restlessness, wrap these round with hot cotton-wool, and modify the position by interposing a few down or cotton-wool cushions. Very probably, and we will assume it so in the present case, the child will now be disposed to sleep, and the necessity for medicinal treatment will be little or none. You may be asked whether, the child being constipated, you should order an aperient. No, for its action means movement of the body and necessarily of the joints, and you want rest. If there be hard faeces in the rectum, a small glycerin enema, or equal parts of olive oil and warm water, to the extent of half a pint, should be administered, but let the evacuation be received with the least disturbance possible of the position of the patient. You give orders that the child shall have no solid food, but pure milk diluted with an equal

quantity of water which has been previously boiled and allowed to cool. He may have, besides, some mutton, chicken, or beef broth. You may be asked whether very strong beef-tea or the artificial beef extract may be given, and the answer I am inclined to give is, No. I think these often do more harm than good in the febrile stage. A meat soup made in the following way answers very well. Let three ounces each of finely minced beef, mutton, and veal, with half a teaspoonful of common salt, be put in a jar with a pint of cold water. After standing for two hours in the cold, add three ounces of pearl barley, and let the whole be stewed gently for four hours. Then strain off the liquid and add thereto, if the child likes the flavor, a pinch of celery salt. If thirst is not sufficiently quenched by the diluted milk, you may allow a small quantity of barley-water flavored with lemon; it is better to sweeten this with a little pure glycerin than with sugar. Or a little weak tea may be allowed occasionally. When the milk and water are taken warm, it is well to add to each cupful a teaspoonful of isinglass jelly, made by dissolving a quarter of an ounce of dry isinglass in a large breakfast-cupful of boiling water. When cold, this becomes a jelly.

After four or five days, if fever has subsided, toasted bread, rusk, or sponge-cake may be given with the milk, and a light milk pudding added to the dietary. Then there may be a gradual approach by fish and light meat to the ordinary diet.

During the convalescence, your chief indication for medicinal treatment is the *anæmia*. For this you must rely on iron and arsenic. Small (twenty or thirty minim) doses, thrice daily, of *vinum ferri* or *syrupus ferri phosphatis*, with two- to five-minim doses of *liquor arsenicalis*, diluted with half-ounces of water, and administered after food, answer very well. You may consider whether a long-continued course of alkalies does anything to ward off rheumatic manifestations. I think not.

You must give some directions as to the hygiene of convalescence, and you should steer in the middle course between "coddling" and rash exposure. Woollen or flannel clothing (light in summer) should be worn next the skin. You must settle the question of cold bathing. I advise that you insist that on rising in the morning the first operation shall be a dry rub with a towel over all the surface, beginning with the soles of the feet, then a warm water or soap-and-water sponge, then a sponge with cool or cold water, and a good towel drying. Do not permit a mere hot-water ablution, in which case the heart is weakened, because the arterioles are relaxed and the individual

bleeds into his own skin. The final cold sponging contracts the arterioles, stimulates the left ventricle to a good systole, and tends to slow the heart-rate.

It is right to urge upon the parents of a child who has once suffered from rheumatism that he should be brought for medical examination at intervals of a few months, for valvular disease of the heart may arise and progress without any manifested symptoms. Even slight pains in the joints—parents and nurses often call these “growing-pains”—are to be interpreted as rheumatic phenomena often of serious import. Many a child, in all probability, has been punished for inertness or shamming, many a rheumatism has been neglected, and many a case of valvular disease of the heart in a child has arisen and progressed unnoticed, because the subtlety and symptomlessness of the disease we are considering have not been appreciated. Impress also upon those who care for the young rheumatic subject that any sign of sore throat must be interpreted as the very probable beginning of an outbreak of the disease. Even a slight tonsillitis has a severe significance.

I have, in the case before us, taken an example of the treatment of rheumatism by the “little cares,”—one managed without special treatment by drugs, but by attention to the laws of health, by the detection and avoidance of the beginnings of evil, in the hope that the years may pass away in which the proclivity to the disease is manifested.

We now turn to a case in which our reliance upon medicinal means of treatment is much more decided.

CASE B.—A young adult, say aged twenty-one, is admitted with pain and swelling of several joints, and with other well-marked signs of acute rheumatism that I need not here recapitulate. There is no evidence of cardiac, pleural, or pulmonary involvement. The pain in the joints is severe. The sponging and cleansing, as in the case just mentioned, have been resorted to, but the suffering is still very great, and we do not hesitate to administer drugs. Our routine plan in such a case as this is to prescribe as follows :

R Sodii salicylatis, gr. xx ;
Sodii bicarbonatis, gr. xx ;
Aque chloroformi, fʒi,

in a mixture every two hours, until six doses have been taken ; afterwards every six hours.

I will not stay to discuss the steps by which we have come to regard the treatment by salicin or its compounds as the best we can

adopt in cases of rheumatism in which the painful affections of the joints constitute the chief feature, nor to debate concerning the best agent among the salicin preparations that we can prescribe. I have come to regard sodium salicylate as the most practically useful drug, and I think it is well to combine it with an alkaline bicarbonate. I usually order fifteen or twenty grains of each to an adult every two hours when the case in its painful stage first comes under our notice, and I reduce the frequency of administration to every six hours, or to three times daily, after the sixth dose has been administered; in some cases at an earlier period, if the pains have almost disappeared and the temperature has approached the normal. We continue, however, to administer the drug three times daily for a considerable time,—usually until the patient is well enough to be discharged from the hospital. In the course of from two to six days, in the majority of cases, the temperature becomes reduced to the normal and the pains disappear. In a few cases the drug does not agree. The toxic symptoms it can induce are delirium, vomiting, deafness, noises in the ears, headache, bleeding at the nose, irregularity or slowing of the action of the heart, and symptoms of heart-failure. In any case wherein such signs are manifested, the administration of the drug should be suspended. There may be, however, a fallacy in the interpretation of these signs, for many of them can be independent of the action of the remedy, and due to the influence of the disease itself upon the central nervous system. We may have recrudescences of pains in the joints under the treatment, but I cannot doubt that in the aggregate there has been greatly increased comfort to the patient since we adopted the plan I have indicated. If the pain returns, we administer the dose every two hours, as at first. The diet during the stage of pain and fever is what we term admission diet, consisting of twelve ounces of bread, two pints of milk, and one pint of beef-tea daily. After the subsidence of the stage of pain and fever there is a gradual approach, through fish and light minced-meat diet, to the normal. In convalescence, at or shortly before the discharge from the hospital, we order a mixture of iron or arsenic, or of both,—*e.g.* :

R Solution of arsenic, $\mathfrak{m}\mathfrak{v}$;
Citrate of iron and cinchonine, $\mathfrak{m}\mathfrak{v}$;
Distilled water to one fluidounce.
Three times a day after food.

The general rules of hygiene should be laid down as in Case A.
A renewed outbreak in an adult is generally attended with more

marked symptoms than in a child, but endocarditis often arises and progresses to deterioration of the valves of the heart without signs of distress or discomfort to mark its course.

We come now to the treatment of a case in which the affection of the joints is of subsidiary importance.

CASE C.—An adult, male or female, is admitted with the ordinary signs of acute rheumatism, and, whilst these are still painfully manifested, it is observed that the heart and pericardium are acutely affected. It is surprising how great a variation in the intensity of the subjective symptoms occurs in patients whose heart-structures are attacked by rheumatic inflammation. In the majority the signs of suffering and danger are obvious enough: a sense of distressing oppression is referred to the præcordium; there is pain on pressure, and the patient cannot bear any incumbent weight; the countenance wears a look of intense anxiety; there is hurried, shallow breathing; the patient, unable to lie down, must be supported by pillows; there may be extreme restlessness; the nervous system is profoundly affected. In a minority the signs of suffering are very slight indeed: there may be no complaint of pain except that referred to the joints, and, especially in children, the course of events can be followed only by the physician who diligently, from day to day, explores the heart by the various methods of physical diagnosis. In some cases your first sign will be a to-and-fro rubbing sound; in others, percussion will demonstrate an enlargement of the outline of the space occupied by the heart, and such enlargements may occur rapidly. If your percussion-note at the upper limit, the third or second left costal interspace, is very dull, abruptly differentiated from the clearer percussion-sound above it, you have good evidence of pericardial effusion. Such effusion may compress the lower lobe of the left lung, so that at the back you may find, over a limited area, about the angle of the left scapula, dulness, bronchophony, and bronchial breathing, indications of a consolidation of a portion of the lung: this is a valuable confirmatory sign of effusion into the pericardium. I am convinced, however, that the rapid increases of dulness over the heart in rheumatism are not all due to pericardial inflammation and the effusion of fluid; the whole heart may become swollen and dilated,—swollen with the products of inflammatory exudation, dilated because of the enfeeblement of the muscle of its right and left chambers. In some cases this condition of swollen heart disappears without any of the friction-signs of pericarditis being manifested; in fact, the heart and its serous membranes may pass through changes like those occurring in a joint

inflamed through rheumatism. These variations in the bulk of the heart may be observed in some cases to be considerable from day to day, and there may be repeated enlargement at intervals of a few days, just as there may be repeated swellings in the joints. (See Fig. 1.)

When signs of pericarditis or general carditis are observed in the course of rheumatic fever, I advise that an ice-bag be applied over the præcordium. I have adopted this plan in such cases for more than two years, and I feel sure that I have had better results than under former measures of treatment. In practice you will find that there are many prejudices to be overcome, but with judicious argument you will probably be able to get your own way. The hatred of cold applications is diminishing. I advise that you apply the ice-bag directly you have evidence of rheumatic pericarditis or of inflammatory enlargement of the heart. If a properly made india-rubber ice-bag is not readily to be procured, use an ordinary sponge-bag three-fourths filled with broken ice, the upper part being folded and clamped by two strips of thin wood placed on each side, and tied together at each end; the leakage will be very slight. Apply this over the region of the heart, and envelop with a soft towel, or with lint or absorbent cotton-wool. Probably there will be a relief of the local suffering, and the application will be tolerated well. In some cases the weight upon the præcordium causes discomfort; then suspend the bag from a cradle, and arrange it so that it covers the surface without exerting much pressure. At first the application may be continuous day and night, the bag being emptied when the ice becomes melted, and refilled. Usually, however, we apply the bag for two or four hours, and remove it for like periods. I believe with my friend Dr. D. B. Lees, who has done valuable service by his paper on the treatment of pericarditis by the ice-bag (see *British Medical Journal*, February 18, 1893, p. 344, and *The Clinical Journal*, November 2, 1892, p. 4), that the introduction of this method of treatment will be found "a great advance in therapeutics."

You observed the boy, aged ten, in Currie ward, who suffered from intense pericarditis with pleuritis and pneumonia, and whose heart was, as I showed you, greatly enlarged and swollen. For several weeks he was in the greatest peril, but the ice-bag treatment was kept up, and he has gone out practically well and strong, though there is the systolic murmur of mitral incompetence at the apex. We traced in this case not only the disappearance of the pericardial effusion, but also the diminution of the bulk of the heart as a whole. I cannot think, from my experience of such cases before the employment of the ice-bag, that under other treatment we should have had so good a result.

The question will now arise, Shall we, in cases in which the heart is thus inflamed, continue our treatment by the salicylates? This is answered by our experience that in some cases such treatment continues to act beneficially, and seems in no way to interrupt the favorable progress towards recovery, whilst in others it tends to weaken the heart and to produce symptoms of cardiac failure. It is a general opinion among those who have investigated the subject, and one that has the support of statistics, that the treatment by the salicyl preparations exerts no direct influence in reducing the prevalency or in mitigating the intensity of the rheumatic inflammations of the serous membranes of the heart. It is by no means proved, however, that it has no indirect beneficial action. If it tends to reduce the pain, and therefore increase the comfort of the patient, it is in the highest degree probable that it has some favorable influence during the stage of acute inflammation and suffering. I have already said that there may be a fallacy, and that some of the adverse symptoms ascribed to it may be really due to the process of disease itself. Let us take two cases in illustration.

Mary Ann W. was recently admitted with well-marked signs of rheumatic fever, of which she had suffered three previous attacks. She was prescribed the usual twenty grains of sodium salicylate every two hours for six doses, afterwards every four hours. After the tenth dose she became very delirious and extremely noisy; then followed an epileptiform seizure. At this time the area of præcordial dulness was not notably increased, but there was evidence of old mitral incompetence, and some dilatation of the left ventricle. The salicylates were omitted directly the signs of nervous disturbance were manifested. The temperature fell to nearly the normal, and the pains in the joints all ceased at the end of three days; the patient was emotional, but all delirium had passed away. Now we found that the heart became acutely and gravely inflamed, and the area of præcordial dulness greatly enlarged, so that the maximum breadth of the dull area was six inches, and at the upper limit in the second left interspace the dulness was absolute: there was undoubtedly pericardial effusion. Whilst these signs were occurring, four days after the previous total cessation of pain, the articular symptoms returned with all their suffering. Again we administered the salicylates in the full doses, but this time none of the toxic symptoms were manifested, and the relief was entirely satisfactory. Again there was a return of the pains and swellings of the joints, and again the salicylates were administered with success. The signs in regard to the heart and pericardium receded most satisfac-

torily, so that fourteen days after their commencement the area of dulness became reduced to a maximum breadth of three and three-quarters inches, and there was no abrupt line of demarcation at its upper limit; the fluid had become absorbed, and the enlargement of the heart—evidenced not only by a reduction of the outline as determined by percussion, but also by recession of the right ventricle as shown by palpation—had become greatly reduced. We noticed, however, a change in the endocardial murmur, which altered its area of audibility and became shrill and musical. It is evident that in this case the rheumatism, which we commenced to treat with the salicylates, was of extreme intensity, recurring, as it were, in successive waves, and involving not only the joints, but also the pericardium, the endocardium, and the heart itself. We ask ourselves how much of the early signs of cerebral disturbance—the delirium and convulsion—was due to the drug, and how much to the intensity of the disease of which it might have been an initial manifestation? You will bear in mind that on the second and third occasions, in the course of the same malady, the administration of the salicylates was attended by no toxic symptoms, but by the usual beneficial signs.

Take the evidence of another case, which at the commencement of the attack was not treated by any preparation of salicin.

CASE D.—Margaret W., aged seventeen, was admitted with signs which closely simulated those of typhoid fever. The patient was in a state of profound prostration; sordes existed about the lips and teeth. There was diarrhoea, and one stool showed the presence of blood. On auscultating the præcordium, I heard a distinct to-and-fro friction-sound. We hesitated long in determining the question whether we had before us the rare conjunction of enteric fever and rheumatic pericarditis, or whether the simulated typhoid was the expression of the asthenia due to the rheumatism which declared itself, contrary to its usual course, first by physical signs in the pericardium and the heart. In this case there was subsequently evidence of great distention of the pericardium with fluid, together with pneumonia and pleuritis. Ice-bags were applied over the heart-region, and, though the symptoms were very severe,—delirium, great dyspnoea, with irregular rhythm of respiration, much pulsation of the arteries of the neck, compression of the lower lobe of the left lung by the distended pericardium, and increasing pneumonia,—yet after sixteen days of treatment the physical signs showed a subsidence of the pericarditis, and in two days more the rub had disappeared.

During this period our chief reliance had been upon the ice-bags,

judiciously supporting the patient with fluid diet, and administering ammonia and ether as stimulants, and brandy in small doses. Here let me say that I never in cases of pericarditis in the acute stage administer digitalis or other analogous heart-tonics. I believe that more harm than good comes from such administration. Failing cardiac fever is best treated by diffusible stimulants,—in critical cases by musk in three- to five-grain doses, or by hypodermic injections of one-sixtieth to one-thirtieth of a grain of strychnia.

To return to our case. Just seven days after the disappearance of the physical signs of pericarditis, twenty-five days after admission, the large joints became swollen and painful, and a typical attack of acute rheumatism ensued. The usual treatment by sodium salicylate was now put in force, and was followed by rapid recovery. The patient went out practically well, but manifesting the systolic apical murmur of mitral insufficiency, which imperfection was nevertheless well compensated.

Now, supposing that we had treated this patient at the first, when the early signs of pericarditis were manifested, by the salicylates, we should have been inclined to ascribe the condition of extreme prostration—the typhoidal state—to their toxic action. None of these drugs were given until the phase of her rheumatism associated with the articular inflammation: then they were of signal service.

To sum up concerning the treatment of acute rheumatism manifested in the joints and in the heart: I advise you to treat any case of acute rheumatic arthritis with the salicylates, even though there be concurrent signs of pericarditis, but omit the drugs and trust to the ice-bag with judicious support and stimulants (and when necessary calmatives), if there be any toxic signs or evidences of inordinate cardiac enfeeblement.

I wish you now to picture to your minds another case which may cause you, the patient in your care, and those who are anxious for his recovery, worries and perplexities akin to despair.

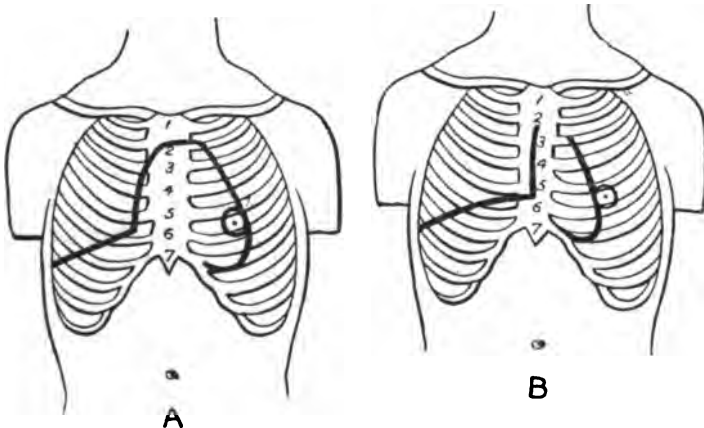
CASE E.—A patient, the subject of acute rheumatism with disease of the heart (pericarditis, endocarditis, and the associated enfeeblement of the myocardium), does not recover under treatment, or, if there be periods of temporary amendment, the morbid process is repeated again and again. The course is so protracted, or the disease assumes a type of such malignancy, that therapeutic means all seem powerless. In such a case you may entertain two hypotheses,—either the rheumatic inflammation, though of the ordinary form, is of exceptional severity, or else there is a superadded infection. In the latter case there is in-

fective, malignant, or ulcerative endocarditis. You will suspect the latter if there be very high risings and low fallings of the temperature, with rigors, perhaps, and sweatings, and if there be repeated signs of embolism; or if, even in the absence of these signs, the patient sinks into a low and listless state, with very feeble heart and dicrotic pulse, and you hear murmurs changing their site and varying in their intensity. Examples of infective endocarditis in the course of acute rheumatism are rare, and your first hypothesis in the event of an unusually severe and protracted course of heart-symptoms is the more probable one.

In such cases I have adopted a plan of treatment to which I now call your attention, and I shall do this by giving you two illustrative examples.

A lad, aged fifteen, suffered from a severe attack of rheumatic fever in March, 1889. He recovered sufficiently to take a tour in Norway. There, at the end of August, he had a second severe attack. The

FIG. 1.

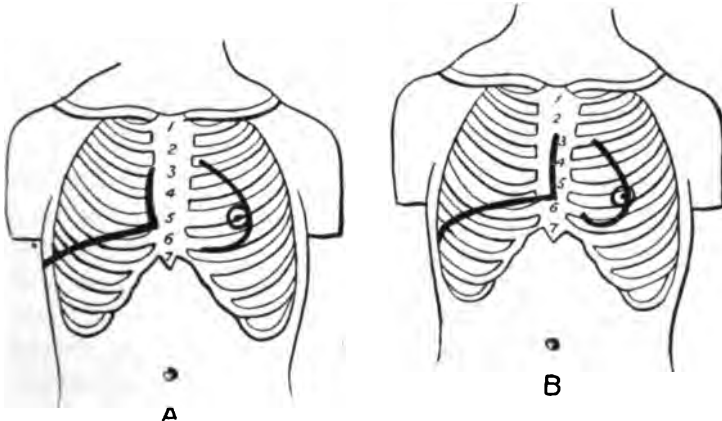


Diagrams showing the recession of præcordial dulness, in a case of rheumatic inflammation of the heart, in the space of twenty-four hours. Endocarditis mitral and aortic.

treatment by the salicylates was followed by improvement, but a fortnight afterwards all the signs returned; the heart became greatly enlarged, the systoles irregular and ineffectual, and murmurs, first of mitral regurgitation and afterwards of aortic regurgitation, became audible. The patient was brought to London in charge of his physician from Norway, and for many weeks his condition was one of extreme gravity. There were successive enlargements of the heart, successive storms of inflammation. The rapidity of enlargement and

subsidence was on some occasions extraordinary ; the variation in a period of twenty-four hours was most marked on one occasion. (See Fig. 1.) In September there was a period of comparative calm, but in October the grave signs returned, and on one occasion I was sent for when the patient seemed to be *in extremis*. The pulse-rate was 100 per minute, the temperature at night 103° F. We again administered the salicylates, but, acting upon a plan which I have adopted for many years in the treatment of the rapid, the irregular, or the irritable heart (especially in Graves's disease), I caused the constant galvanic current from eight cells to be administered for six minutes three times daily. The modes of administration of the current in cases of Graves's dis-

FIG. 2.



Showing the recession of dulness in a case of pericarditis with effusion in the space of nine days.

ease are carefully given by Dr. H. W. D. Cardew in his communication to the *Lancet* of July 4, p. 6, and July 11, 1891, p. 64, to which I refer you. Suffice it now to say that one electrode (the anode)—a flat metallic plate, covered with soft tissue, moistened with hot water—is applied over the nape of the neck, and the other (the cathode)—a metallic tissue-covered button, similarly moistened—is pressed over the skin of the neck outside the larynx (*i.e.*, near the situation of the great nerves in the neck), or moved slowly up and down from mastoid process to clavicle for three minutes on each side.

Under this treatment the patient greatly improved ; the pulse-rate came down to 88, 84, and 76, with little variations. He soon gained strength, and was able to undertake a voyage to America. He has since returned, and I have seen him a hearty, strong, young man with

no adverse symptoms but the warning note of a murmur of aortic regurgitation, this condition being at present well compensated.

Another case has been more recently under my care in consultation with Dr. Douglas Lithgow. A boy, aged fourteen, suffered in April, 1893, a severe attack of rheumatic fever, when the systolic murmur of mitral regurgitation became manifested at the apex. There were repeated rheumatic storms, but in September the patient had sufficiently recovered to be taken to the sea-side for convalescence. There (at Eastbourne) he was seized with most severe symptoms of pericarditis, pleuritis, and pneumonia. He was brought back to London, and I saw him again in November. There were then great dyspnoea and anxiety, the heart was greatly enlarged, especially the right chambers, pericardial friction was very marked, and there were abundant evidences of pneumonia and pleuritis. Systolic murmurs were heard at the apex of the heart and at the base of the ensiform cartilage. I considered that both the mitral and tricuspid valves were affected by rheumatic endocarditis. Subcutaneous rheumatic nodules were abundant and extremely large: four were over the right elbow, three over the left knee, others were over the right patella and the extensor tendons of the right middle finger and of the left middle finger. You will remember that such nodules have a dangerous significance: when they are present there is almost always a very severe heart-rheumatism. Salicylates had been judiciously administered, but all drug-treatment seemed to be ineffectual. At the end of December we commenced treatment by the continuous current from four dry chloride of silver cells (current, two to three milliampères) from the nape of the neck to the course of the great nerves in front of the neck for six minutes, three times a day. At the end of a week there was very great improvement, and in a fortnight the pulse-rate had fallen from 100-120 to 84-80, all signs of heart-distress and of dyspnoea had gone (the respiration rate being reduced from 44-40 to 20 per minute), the area of pericardial dulness had so greatly diminished that the left border was well within the nipple-line, but the right border still projected beyond the right edge of the sternum. The case progressed favorably from day to day, and good nutrition rapidly returned.

I will theorize no more than to say that it seems to me that the good results which I have observed to follow the use of the continuous galvanic current, employed in the way I have indicated, cannot be fortuitous, that it is unlikely that they are due alone to an awakening of the vagus to a more healthy control of the heart-rhythm, and that it is probable that an influence for good is exerted upon the trophic

mechanism of the heart. I recommend you to adopt this plan of treatment when you meet with similar cases of protracted rheumatic inflammation of the heart and its membranes.

If from the evidence presented to you you are of opinion that septic endocarditis is in progress, you may conclude that the case is almost hopeless,—but not quite. In *The Practitioner* of August, 1886, I described a case of grave or septic endocarditis in which the internal administration of thirty-grain doses of sulphocarbolate of sodium and the inunction of carbolized oil was followed, after some weeks, by such decided improvement that the patient was eventually discharged from the hospital practically in good health. Ten months afterwards the patient was readmitted with a new outbreak, which soon proved fatal, and in a second communication to *The Practitioner* I detailed the subsequent history of the case, and the appearances manifested post mortem. There was clear evidence that the former inflammation and ulceration of the aortic valves had been arrested, one of the sites being marked by a depression and loss of tissue in one of the cusps, which appeared as if a portion of its border had been punched out. Exuberant vegetations, crowded with micrococci, attested the new outbreak of the disease, which was fatal before therapeutic means could have any power to check it. I have since had under my care cases in both the male and female wards in which there seemed to me good evidence that septic endocarditis was in progress, but under the protracted administration of half-drachm doses of sodium sulphocarbolate every four hours there has been improvement and even recovery.

I have now sketched the treatment, which I consider to be sanctioned by experience, of cases of various phases of rheumatism. Before concluding this lecture, I will ask you to bear in mind that in some cases we have found that an affection of the joints which we have considered to be rheumatic has been rebellious to the salicylates. The suffering has continued unabated, and then there has been a concentration of the morbid signs in one or two joints, where the swelling and the bony enlargements have been excessive. You may suspect these occurrences (1) in subjects previously rheumatic, over the age of thirty-five; (2) in young subjects when the pain and swelling are manifested not only in the larger but also in the small joints, especially the knuckles. Then it is my opinion that you have to deal with two processes,—first, true rheumatism; secondly, a non-rheumatic arthritis. The treatment of these complicated cases will claim our attention on a future occasion.

THE HAND AND TONGUE IN THE DIAGNOSIS OF DISEASE.

CLINICAL LECTURE DELIVERED AT THE JEFFERSON MEDICAL COLLEGE HOSPITAL.

BY H. A. HARE, M.D.,

Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia.

GENTLEMEN,—I propose in the hour which has been set aside for this lecture to discuss the value of the hand and tongue in the diagnosis of disease. Every practitioner of experience gains a large amount of information concerning his patient from the appearance of the various parts of the body which are exposed to view under ordinary circumstances, and is thus enabled to form some idea of the character of the malady before a question is asked the patient. The advantage of obtaining a clue which shall put the physician on the proper track to discover the minute details of a man's condition is great, and often will impress both the patient and his friends with the belief that the medical man is possessed of an extraordinary amount of penetration and acumen. Some of my hearers may have heard several lectures given by the late Dr. D. Hayes Agnew upon diagnosis at sight as the patient appeared in bed or walked into the office, and every one who has put those lessons into his practice must have been impressed with the force of the observations made by that great surgeon. His lectures were, however, directed solely to surgical diagnosis, and so far as I know there is little in literature as regards the diagnosis of general medical ailments by means of superficial symptoms, unless it be in that clever little manual of Fothergill upon "Aids to Diagnosis." I shall, therefore, attempt to bring together a number of facts in such a way that they shall be grouped about the parts of the body named.

Taking into consideration the hand and the diagnostic points to be obtained from it, we naturally first note such common signs of disease as œdema, or the chalky pallor indicative of subacute or chronic nephritis. If the œdema is unilateral, it may be due to lymphatic or other injury in the axillary region, or to aneurism of the aorta. In

such a case the entire arm will share the swelling, whereas a puffiness of part or all of the hand may be due to angioneurotic œdema. The development of thickening about the joints of the fingers tells the story of rheumatism, rheumatoid arthritis, or gout, and these can often be separated one from the other with readiness. In the first place, the joint-swelling of rheumatism is more apt to involve the wrist than the fingers; whereas in rheumatoid arthritis and gout the phalanges are the parts most affected. In the second place, the joint-changes in acute rheumatism are attended with swelling and heat, the swelling being soft or puffy, while that of gout is hard and resistant. During the acute attack the tenderness of gout is greater than that of rheumatism, and in both of these affections the tenderness is in excess of that manifested by the fingers of rheumatoid arthritis. Again, rheumatism is characterized by accessions of pain in the part affected, whereas the pain of rheumatoid arthritis is practically constant, and because of this characteristic is more to be dreaded, on account of the greater suffering it entails. It is true that this question as to the relative amount of pain is more subjective than objective, and may not be of diagnostic importance; but pressure with the fingers on the joint of rheumatoid arthritis, while it develops tenderness, never causes the agony produced when the same pressure is exercised upon the swelling of acute gout or acute rheumatism. Then, too, gout affects the toes far more frequently than the fingers. But what are the actual differences to be noted in the joints of the hand in rheumatism, rheumatoid arthritis, and gout? As already said, the truly rheumatic finger is inflamed, puffy, angry, and hot, while the other diseases show none of these changes, unless it be during an exacerbation of gout. The joint of rheumatoid disease is deformed by the absorption of articulating surfaces with consequent dislocation partial or complete, and the abnormal formation is produced by this and exostoses, while that of gout is characterized by the deposit of large amounts of sodium urate in the sheaths of the joints in such profusion that immobility and deformity occur from fixation as with a splint, any actual alterations in the articulating surfaces themselves being secondary rather than primary. Again, rheumatoid arthritis nearly always spares the thumbs, while gout often affects them.

An important fact to be remembered, however, is that the deflection of the fingers of rheumatoid arthritis and gout may be equally great, but that in the one case the enlargement of the articulation is not excessive, whereas in the other the excessive deposits produce still greater deformity.

In rheumatism there never occurs a deposit of chalk-stones in the joints. In gout the backs of the hands may be scratched, from the itching of the skin produced by that diathesis.

Leaving these points, we find the characteristic clubbed fingers of the victim of pulmonary disease (phthisis or emphysema) or cardiac lesion in early life, while the blue finger-nails, more constant in children than in adults, direct the ear of the physician to the præcordium to discover cardiac difficulty. Closely associated with this clubbing of the finger-tips are the enlarged joints with the thin bone shafts between the joints, indicating a tendency to struma. In rickety children near puberty this is particularly well marked. Again, in pulmonary tuberculosis the wasting or hollow interosseous spaces on the back of the hand may prove of value in discovering the cause of the illness, while the claw-like fingers, with dried and shrivelled nails, may indicate diabetes, particularly if the skin is dry and harsh.

The nails not only appear lustreless, dry, and ridged perpendicularly in diabetes, but are often the best evidence of gouty taint in their striation, or in the white spots which dot them; but, as Hutchinson has shown, these spots also occur in children who injure the base of the nail by picking at it.

Again, Fothergill states that in some cases of jaundice stretching the skin on the back of the hand will show the characteristic yellowing which may not show elsewhere. The cold, clammy hand is thought by some to be a pathognomonic sign of masturbation, particularly in girls, and the clumsy, loosely-jointed, puffy or woolly hand is generally found in persons of feeble mental power. In some cases of phthisis the nails are arched from side to side till they seem like claws, and in nervous disease due to injury and resulting in trophic disturbance the nails may become incurvated or may fall.

Other signs attached to the hand are tremor and contraction. Tremor of the hand may indicate paralysis agitans, general paresis, mercurial, plumbic, or alcoholic poisoning, hysteria, senility, Graves's disease, chorea, both ordinary and post-apoplectic, athetosis, and disseminated sclerosis. How shall we separate these states of tremor in the hand in order to reach any point of diagnostic value?

In paralysis agitans the whole hand is involved, and generally both hands are equally affected. The tremor is rhythmical and fine or minute in character. The tremor is a slow one, say five vibrations per second. It is more or less constant, and worse when attention is called to it, but it is not greatly increased, and perhaps is even decreased, by a voluntary act, such as an attempt to raise a glass of

water. The fingers are generally semi-extended, and the thumb is adducted, so that it constantly rubs the index finger with its pulp as if it were attempting to rub off the skin of that member. Frequently there is pain and aching of the extensor muscles of the forearm and wrist from the constant exertion. The tremors of disseminated sclerosis are also slow, but coarse in character. They are not constant, but are developed upon intentional movement, and have a greater amplitude than those of Parkinson's disease. Often threading a needle will be possible in such persons, because it is a short act, while lifting a glass of water will be impossible. The tremor of mercurial, plumbic, and alcoholic poisoning resembles that of paralysis agitans, save that it is more rapid, reaching nine or ten vibrations per second, and in the case of alcoholic tremor is decreased by a large drink of liquor, while those due to lead and mercury are rapidly relieved by potassium iodide. Further than this, the tremor of alcoholism is generally worse in the morning. The tremor of general paresis is also rapid, eight to nine per second, and is a very fine tremor, which may be felt only when the arm is extended and the fingers rested on the hand of the physician. The tremor of the hand of general paresis is generally not a predominant symptom, but is elicited when the muscles are put upon a strain. In regard to the fineness of the tremor of general paresis, it should be remembered that it closely resembles that of Basedow's or Graves's disease, since the tremor of this condition is not only equally fine, but generally unseen except when the arm is extended and the tips of the fingers rested upon the fingers of the doctor. This tremor has been called the "railroad bridge tremor," because of its fineness and vibratory character. The individual fingers do not separately tremble in Graves's disease.

Beyond the state of tremor should be recalled the movements of chorea, which may be limited to one arm or hand, and which in their milder forms may be confused with the pronounced movements produced by effort in disseminated sclerosis. The latter are often very arrhythmical, and so the choreic movement the more closely resembles them; but those of sclerosis are purposive, while those of chorea are not, since the movement contemplated in chorea is opposed by a contradictory contraction. Athetosis consists of movements in which there is no rest, and the movements are incoördinated, as in chorea. On the other hand, athetosis is separable from chorea in that the movements are slower and limited to the fingers and wrists, the arm escaping.

There remain three other important diagnostic possibilities in the hand. The first of these is manifested in dactylitis due to syphilis,

or some eruption characteristic of this disease; the second in the ulcerated bases of the finger-nails with ecchymotic spots on the skin produced by the chloral habit; and the third is the sign which tells us of the occupation of the patient,—the smooth, soft hand of the professional man or clerk, the horny hand of the laborer, or the blackened nails and skin of the machinist, or the blue-black dottings of the hand of the miner.

Passing from the hand to the tongue, what are the diagnostic facts to be obtained from an examination of this organ? They group themselves, such as they are, about the character of the coating of the tongue, the general appearance, and the movements of the muscles governing it. Let us see whether the coating is really of much diagnostic value beyond telling us that digestion is deranged.

Before doing this, however, let us endeavor to have a clear idea of the condition of the mucous membrane of the tongue which underlies such changes. Probably the best study of this question, both clinically and microscopically, is that of Dickinson, of London, with whose paper many of you are familiar. Very briefly stated, he finds that there may be a coated tongue in health as well as in disease, but that this tongue when it is coated is covered by a growth of the papillæ which may be slightly excessive, and each papilla is capped with a minute white patch which consists chiefly of horny epithelium. Several of these white-capped papillæ now coalesce and form what Dickinson calls a stippled or dotted tongue. When the coalescence of many takes place, an even coating is developed, which consists not only of the white-capped papillæ, but also of free epithelium and other detritus which fills in the interspaces between the papillæ. When this coating becomes so heavy that the papillæ or other objects are flush with the adventitious matter, or, in other words, when the cast-off epithelial cells cover all objects, as snow levels the landscape, we have developed what Dickinson has called the plastered tongue. Again, we have what may be called the furred tongue, in which, as shown by the author just quoted, the papillæ are elongated, and yet remain to some extent separated from one another so as to give a shaggy appearance. Last of all, these various degrees of coating may, as a result of mouth-breathing, fever, or lack of salivary secretion, become incrustated or dried, and in drying become brown or blackish. Beginning at this, the worst stage of coating, and going towards the conditions of denudation or nakedness of the tongue, which in many cases is more indicative of disease than the coating itself, we find that the process consists of a drying and therefore brittle state of the coat, which breaks or wears off,

leaving a dry, translucent membrane which may look raw. If this surface is moist, this change is favorable; if dry, it may be quite the contrary. The membrane which is now present rapidly develops an epithelial covering, or, if the case is desperate, becomes dried, cracked, fissured, and bleeding. In other words, the process is one characterized by the infiltration of leucocytes, just as would occur in the true skin when denuded of its epidermis and exposed so as to become dry and harsh. Such a tongue is far more indicative of grave disease than that coated with the heaviest coating, and is generally associated with some great drain upon vitality, as dysentery, particularly with hepatic abscess, or sloughing wounds. For this reason, therefore, we find this tongue is a symptom of prolonged disease, such as advanced tuberculosis (parrot tongue). The development of this state of the tongue is dependent upon deficient moisture associated with failure of the growth of new epithelium and papillæ, which is partly due to the deficient salivary secretion, and partly to great systemic depression, so that the regeneration of all cells is almost impossible. The general indications of coating of the tongue, when sufficiently marked to be indicative of anything, are that through mouth-breathing micrococci and dust add to the dead epithelium already rapidly being cast off, and the failure of the patient to move his tongue as actively as in health, either in speaking or in eating, results in an overgrowth of the papillæ which are not worn down. The greater the depression of the general system, the more wide-spread the death of the epithelial cells and the less the effort to dislodge them from the mouth either by swallowing saliva or by expectoration. So also the advance of an exhausting disease results in mouth-breathing, which dries the already coated tongue.

Having considered the general indications of the coated and bared tongue, does this organ offer us any more definite information in relation to individual disease? Every one with experience will say that it does.

There is no doubt that the tongue of enteric fever is most characteristic in the adult, though of little value comparatively in the child. In the earlier stages, the glazed surface and bright red edges give at least a hint as to the malady, and in the second the heavy coating is almost rugose in appearance, brown or black, but leaving the centre comparatively bare, while the edges remain red and beefy-looking. In catarrh of the stomach or bowels in children two appearances of the tongue are characteristic, the one of acute disorder, the other of the more chronic form represented by general catarrh and called by Eustace Smith "mucous disease." In the first variety the tongue is

generally a little dry and faintly coated over; on its anterior surface are distributed minute red points (enlarged papillæ). In the second class the tongue, still lightly coated, has over its surface patches denuded of epithelium, red and shining, or, as some one has expressed it, looks as if it had been worm-eaten. This is a process of denudation in localized areas due to some change in the nutrition of the mucous membrane characteristic of the disease. The tongue of scarlatina is often called the "strawberry tongue," because the enlarged and red papillæ show over the generally red surface of mucous membrane even more markedly than the red of that membrane itself.

What is the relation of the tongue to disorders of the digestive apparatus? There is no doubt whatever that Dickinson is in error when he is inclined to refer to imagination or erroneous belief in the relationship of cause and effect the differences in the tongue ascribed by physicians to digestive disorder. The heavily coated yellow tongue of the bilious is too well known to be disregarded, and, while we may not be able to define the causes which produce it, it still remains an undeniable indication for a cholagogue. Fothergill asserts that this color and taste are due to taurocholic acid eliminated by the saliva, and, as the salivary glands act as such powerful eliminators, it is probable that other substances are at times set free in the mouth which directly or indirectly produce coating. Often in unilateral coating the trouble lies with a decayed tooth, the secretions from which cause a change in the epithelial cells near by. Similarly the color of the coating of the tongue may tell us what medicine, food, or drink the patient has been taking, as, for example, the black tongue of iron or bismuth, or the brown tongue of liquorice.

So far as coating is concerned, the error of observation generally lies in examining the tip of the tongue, when in reality the back portion is heavily coated.

We have still to consider the diagnostic value of the general appearance of the tongue, and the way in which the organ is extended or retracted. Among the important signs to be noted are scars of old or recent bites due to epileptic attacks, and these scars in those who are subject to fits are of importance diagnostically, since they serve to separate the attacks from those of hystero-epilepsy, in which the tongue is never bitten. The presence of a small ulcer may indicate a chancre of the tongue or a beginning epithelioma. A somewhat smooth tongue, superficially fissured, is believed by Fothergill to indicate a person addicted to the use of very hot tea, and the broad, flabby tongue marked all along the edges by the impression of the teeth is about as clear an

evidence of general debility and atony of the digestive apparatus as it is possible to find. The color of the tongue often gives us a fair idea of the degree of anæmia from which a patient may be suffering.

The movements of the tongue have as great significance as the coating, if not even greater. Aside from the slow protrusion of the debilitated and the sudden extrusion of the nervous and excitable, its movement tells us of conditions of the nervous system. Every one is familiar with the slowly protruded, trembling tongue of advanced typhoid, which, when once out of the mouth, is apt to remain there till the physician repeatedly orders its return to the mouth. If the nervous symptoms of enteric fever are marked, the characteristic fine tremor of the tongue is notable, particularly when the effort is made to move the organ. While the order for showing the tongue needs to be repeated frequently in diseases associated with hebetude, it is a curious fact that patients will often obey this command when so deeply comatose as to be incapable of any other form of obedience. In apoplexy the tongue is of course protruded towards the paralyzed side, and in glosso-labio-pharyngeal paralysis the tongue affords one of the earliest of the symptoms, in that its clumsy movements call the patient's attention to his condition chiefly through failure of the lingual sounds in speech. Later in this affection the tongue shows marked atrophy, which may be manifested by a fissured shrivelled appearance, or by local areas of marked atrophy along its edges, giving it a crenated appearance. The size of the tongue is also notably decreased to the eye and touch, and on the mouth being well opened the organ is seen to be affected by fibrillary tremors. If the patient be asked to remove a piece of food from between the cheek and the gum by means of the tongue, he will do it clumsily or not at all. Frequently severe bites of the tongue occur, showing the lack of power in the patient to keep it out of the way of the teeth. This loss of power of the tongue is also seen in rare cases of tabes and progressive muscular atrophy.

While the tongue in true paralysis is always protruded towards the paralyzed side, in hysteria it is always protruded towards the well side.

It is of interest to remember that, in multiple foci of cerebral softening, where the lesion occurs in the cortico-muscular tract containing the fibres supplying the tongue, while the tongue may be paralyzed, it does *not* atrophy, as it does in glosso-labio-laryngeal paralysis.

Sudden loss of power of the tongue indicates acute paralysis due to hemorrhage or embolism or thrombosis of the basilar artery. Again, there may be rapid loss of power in the tongue from acute bulbar inflammation, in which case the loss of power is not so rapid as

in hemorrhage or embolism, but is more rapid than in glosso-labio-laryngeal paralysis. Compression of the medulla from tumors, aneurism, or bone disease may also produce paralysis of the tongue.

I shall not speak of the eruptions of the tongue closely allied to those of the skin, as, for example, herpes, though they have great diagnostic value in regard to other diseases, but shall finally call your attention to the small, wizened, contracted, red, and irritable tongue of acute peritonitis, and to the ulcer of the frænum in children which occurs in some cases of whooping-cough.

In lesions of the nucleus of the hypoglossus the tongue is found to be affected with hemiatrophy, and to be subject to fibrillary tremblings. The appearance of the affected side of the tongue is like that of the entire organ in glosso-labio-laryngeal paralysis. Protrusion of the tongue is fairly well performed through the vicarious action of the normal half.

Sometimes post-apoplectic chorea manifests itself in the tongue, and a tremor of this organ is also seen in general paresis when the patient attempts to speak.

THE CONDITION OF THE HEART IN MITRAL INSUFFICIENCY AND IN CHLOROSIS.

CLINICAL LECTURE DELIVERED IN THE CHARITÉ HOSPITAL.

BY PROFESSOR CARL VON NOORDEN, M.D.,

Berlin, Germany.

GENTLEMEN,—I bring before you to-day two cases which we will study with the purpose of ascertaining an exact knowledge of the condition of their hearts. You will then be convinced that the symptoms of disease which we find in the hearts and in many other parts of the circulatory systems of both patients bear an extraordinary resemblance to each other, so that a careless examination and a superficial recognition of the accompanying circumstances would lead one to diagnose both cases as the same disease. A closer study of the two cases will show you that they are quite different.

Allow me in the first place to consider a little the previous history of these patients.

CASE I.—Let us first take the case of Fräulein D. The girl is seventeen years old. Her parents are living and healthy, as are, also, her two brothers; one sister suffers from chlorosis. She herself in childhood had measles and whooping-cough, and was then perfectly healthy until her fourteenth year, when menstruation began, which was generally accompanied by pain, so that the patient was confined to her bed during the first two days of her sickness. At fifteen she had articular rheumatism, which was, however, slight, and in three weeks her health was fully regained. Last year, while the patient was a saleswoman, she had influenza; the attack, however, was slight, and was over in three days. It was at that time that I first saw the patient and examined her. Because of her history of former articular rheumatism, I examined her heart with particular attention, and I can affirm that at that time the size of this viscus and the heart-sounds were perfectly normal. A few weeks later, when she had occasion to consult me regarding an acne of the face and neck, I found the condition the

same. I am thus in a position to state that there was not, as a sequela of the articular rheumatism or influenza, a lesion of the heart. About ten weeks ago the usual symptoms of chlorosis began to show themselves in this hitherto apparently healthy girl,—paleness of the hands and of the mucous membranes, weakness, sleepiness, giddiness, twitching of the eyelids, palpitation of the heart, shortness of breath on going up-stairs, and paucity of menstruation. In the first weeks of the trouble she took Blaud's pills; later there was no treatment. At present her condition is anæmic. You see before you a very pale girl, whose external appearance gives you the impression of a chlorotic patient. Her blood is thin. The number of the red corpuscles in a cubic millimetre is three million eight hundred thousand; the amount of hæmoglobin is about 7.70 grammes, or a little more than one-half of the normal amount. The urine is plentiful (eighteen hundred to twenty-two hundred cubic centimetres per diem), free from albumin and sugar, and very pale, as is generally the case in chlorosis. The condition of the circulation will be spoken of later. In general the most careful examination has been unable to detect any disease of the viscera.

CASE II.—Fräulein G. The girl is nineteen years of age. Her father is alive, and is healthy. Her mother died in childbirth. She has no sisters or brothers. As a child, she had measles, scarlet fever, and diphtheria. She has since been well. She was brought up in straitened circumstances. Her menstruation began in her thirteenth year, and was regular. Later, she had articular rheumatism, and was five weeks in the hospital of her native town. At that time she was told that she had a heart-lesion as a result of the articular rheumatism; nevertheless, she has never had subjective symptoms which could in the least be referred to such a condition of the heart. Soon after her recovery from the rheumatism her surroundings became improved, inasmuch as she obtained a situation in a family where her work made few demands upon her bodily strength. She tells us that here she became much stronger, and in fact you see before you a person of healthy appearance of whom you would not suspect that she had had to struggle with hunger and misery. She affirms, further, that she has at present no trouble with palpitation or breathlessness, and that it is only when she climbs a high stair that she feels any difficulty. I emphasize this the more, as the existence of a heart-lesion is well known. I shall speak later of the circulatory system. The other viscera are healthy. The patient was sent to us on account of a slight angina follicularis, which a two-days' treatment entirely relieved.

It will be our purpose to apply ourselves to the study of the circu-

latory system of these two girls, and especially the condition of the heart. You will see that the differential diagnosis presupposes a very exact examination and careful consideration. We have now before us a question that is of practical value and often arises. How shall we determine whether the chlorotic girl (Case I.) is an example of heart-lesion or not? The second case serves as a comparison.

The Condition of the Circulatory Apparatus in Case II. (Mitral Insufficiency); Condition of the Thorax.—I will next speak to you concerning the symptoms which are found by the objective examination. The thorax is normally formed, of average depth and width. It is necessary to recognize this, as a too wide or a too narrow thorax gives rise to a deviation of the apex-beat and heart-dulness, which must be considered. The apex-beat of the heart is perceptible over the sixth rib, in an area greater than normal; it reaches to the left one and a half centimetres beyond the nipple-line. At the point of the apex-beat a forcible systolic upheaval of the intercostal space is felt. There is, however, no murmur to be detected, even when the patient sits up or lies upon the left side.

The Closure of the Valves of the Pulmonary Arteries.—In other parts of the thorax is discovered a heart's action that does not contradict this opinion. The examination of the second left intercostal space gives a positive murmur. Then there is felt, one centimetre from the left sternal border, a short, sharp, deep-seated and well-defined impulse, which recurs rhythmically and is most clearly heard on full expiration.

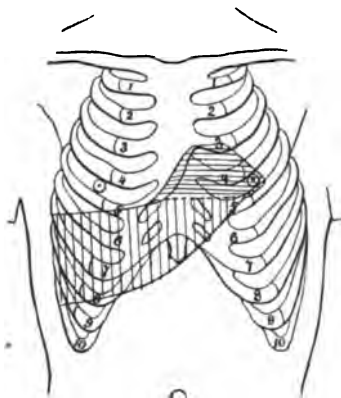
The comparison of the time of the impulse with that of the carotid artery shows that the two alternate, and that the impulse is diastolic, and there can be no doubt that it is produced by the recoil of the blood against the pulmonary valves.

Diagnostic Conclusions.—From these inspections and palpations it is possible to draw very correct conclusions. At the same time it is necessary to be certain that the lungs are sound, as they are in this case. The outline of the lungs is normal; they extend in front on the right side to the sixth rib, on the left from over the sternum to the fourth rib. Over all respiration and vesicular murmur are normal. There is nothing abnormal in their position over the heart.

We learn from these conditions, and from the position and condition of the apex-beat, that there is a dilatation of the left ventricle; perhaps, also, an unimportant hypertrophy of the muscular wall. Further, we learn from palpation over the pulmonary orifices that an increased rebound of the blood-current occurs over these valves. We

conclude from this with certainty that there is an increased resistance in the pulmonary circulatory system, together with increased functional power and hypertrophy of the right ventricle.

FIG. 1.



Areas of cardiac and hepatic dullness in a case of mitral insufficiency (Case II.).

The Cardiac Dullness.—Percussion confirms our assertion that the cardiac dullness extends farther than usual to the left (Fig. 1); it reaches to the nipple-line; but not so the apex of the heart. The apex is normally covered by the lungs. Concerning the heart-dullness, we find that it extends nearly to the middle of the sternum, a little to the left of the middle line. Of course we do not expect to determine definitely from the percussion a diagnosis of the hypertrophy of the right heart. Unless the muscular structure of the heart wall is thicker by one and a half to two millimetres, that hypertrophy, as shown by the portion pressing against the thorax wall, will not be discernible. It is a different question when we consider if we can diagnose a ventricular dilatation that overlaps the left sternal border. I must here warn you that in many women you cannot draw this conclusion, as very often the heart-dullness is not exactly in the left sternal border, but reaches a little farther to the right. We cannot carry our diagnosis by percussion further than that by inspection and palpation.

Auscultation of the Heart.—Auscultation of the apex gives a loud systolic smooth murmur. The second sound is clear. In the second intercostal space to the left of the sternum we find a loud smooth systolic murmur, combined with a loud rattling second sound. In the right second intercostal space, pure sounds are heard; the second sound

is softer than at the pulmonary artery. Over the orifice of the tricuspid valves we hear two pure sounds. The second tone is more accentuated than the first. When we tabulate these phenomena in our usual method we get the following chart :

A.	P.
— — —	—
T.	M.
— — —	—

Diagnosis.—The localization of the murmur over the apex and over the left auricle of the heart proves an insufficiency of the mitral valves. The intensification of the pulmonary sounds at the place of their origin and over the right ventricle confirms the diagnosis (tricuspid orifice). So, without research, except by the ordinary methods, we have established the diagnosis of mitral insufficiency.

Condition of the Pulse.—Let us now look at the general condition of the circulatory system. We find a medium full pulse, with eighty-two beats to the minute and regular. By compression of the artery

FIG. 2.



one feels a second impulse, for the detection of which practice is required. The accompanying sphygmogram makes clearer this conclusion that we have to deal with a dicrotic pulse.

Auscultation of the Arteries.—Over the carotid artery we hear two clear tones; on the crural artery a soft diastolic sound. Over the jugular and crural veins there is nothing perceptibly abnormal.

CASE I.—The Examination of the Circulation in the Patient D. (Chlorosis).—We will now compare with this case of mitral insufficiency another case of chlorosis. We perceive at once that we have to do with a chlorotic girl. We will now study her case. You will

see that the examination will bring us to conclusions similar to those arrived at in the other patient. A few slight differences, however, are perceptible, which are generally overlooked, but which are very essential to the diagnosis. Proceeding in a method similar to that adopted in studying the last patient, I shall examine with you each separate symptom; later we will study simultaneously the symptoms of the two patients and compare them.

Condition of the Thorax; Frequency of the Breathing.—The thorax is normal in form, as strongly made as in the other case, and as wide. The breathing is increased in frequency, twenty-eight to thirty per minute. This high rate is due, in part, to the physiological excitement which the examination causes. Besides, we find, on the chart where we record the pulse, temperature, and respiration, a frequency of respiration of twenty-two to twenty-four per minute. As the normal respiration in healthy women is from seventeen to twenty per minute, we must conclude that this rate is above normal.

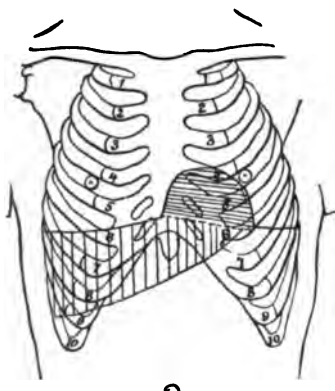
The Pulmonary Area is larger than normal: its boundaries are, on the right, the parasternal line, on the upper border of the fifth rib; on the left side, the sternum, at the level of the third costal cartilage. There is full resonance, with vesicular breathing over the entire lung.

The Apex-Beat.—The heart's action shows its presence in the fourth intercostal space, immediately over the fifth rib. There we see a rhythmical impulse which is one and one-half centimetres outside of the nipple-line. On palpation one feels a strong action of the apex, as if directly under the finger, moving backward and forward.

Pulsation of the Pulmonary Artery.—Besides this one sees a rhythmical motion in the second left intercostal space, just outside the sternum, and towards the left, two to two and one-half centimetres wide. The intercostal space is upheaved during systole, and depressed during diastole. These movements are plainer during expiration than in inspiration, though then they are not entirely lost; when, however, the patient takes a deep inspiration and holds it for a short time, they are imperceptible. If the finger is laid upon the point an impulse like a shallow wave is felt during the systole of the heart, and if the finger remains there during diastole this is felt to disappear. A perfect, well-marked systolic impulse which is synchronous with the apex-beat or the peripheral arterial pulse is not felt. So, during diastole, an impulse with as sudden a beginning and as sudden an ending is perceptible, which shows, when present, a return impulse against the pulmonary valves. Finally, there is in the thorax no perceptible movement that can be connected with the heart's action.

The Heart's Dulness.—Percussion gives absolute dulness, extending from the level of the third costal cartilage towards the left in a shallow curve and thence downward to the apex. Over the apex we find, likewise, a dull sound. Outside of the apex-impulse there is,

FIG. 3.



Areas of cardiac and hepatic dulness in a case of chlorosis (Case I.).

about half a centimetre away, a clear percussion-sound. On the right side the percussion dulness extends diagonally across the sternum, in order to reach the junction of the fifth rib with the right sternal border. It is possible to establish by percussion that the heart extends well to the left, and particularly that it reaches farther than the left lobe of the liver (Fig. 3); the lower heart border is also easily mapped out. We find that at the junction of the upper border of the fifth rib with the nipple-line on the left the dull percussion-note is changed into a loud, deep tympanitic sound.

Auscultation of the Heart.—Auscultation gives the following. Over

<p>A.</p>	<p>P.</p>
<p>T.</p>	<p>M.</p>

the apex-beat is heard a loud systolic murmur which conceals completely the first sound; the second sound is clear. In the second left

intercostal space is a loud systolic sound ; the second sound is pure. In the second right intercostal space is a loud systolic sound ; the first sound is scarcely to be heard, the second one is clear. It is noteworthy that the systolic and diastolic sound phenomena are distinctly lower than in the pulmonary area. Over the tricuspid orifices is a soft systolic murmur, almost as strong as over the aorta. The first sound can be heard with it ; the second one is clear, but is markedly softer than over the apex.

Auscultation of the Blood-Vessels gives over the right and left carotids two clear tones. Over the bulbus venæ jugularis is heard a strong venous souffle, stronger on the right than on the left. The souffle is also to be heard when the patient stretches her head forward. Over both arteriæ crurales, by a lightly-applied stethoscope, an uncommonly perceptible double tone can be heard. The *radial pulse* is regular, eighty to the minute, of medium fulness, though perhaps a little fuller

FIG. 4.



than normal ; the artery is soft. The artery swells out and contracts quickly ; there follows a second small wave, and one can thus with the finger make the diagnosis of the dicrotic condition of the pulse. The sphygmogram shows the dicrotic condition of the pulse even better.

Diagnosis.—We have now collected the material upon which we can establish a diagnosis of the condition of the heart. I will give you my diagnosis immediately, and then endeavor to confirm it.

Diagnosis, chlorosis : retraction of the lung, with elevation of the diaphragm ; anæmic heart and hæmic or functional murmur.

Analysis of the Symptoms and Confirmation of the Diagnosis.—Is the heart enlarged ? By the examination of the heart we recognize the fact that the heart presents a larger area of dulness on the thoracic wall than normal. The very important question then arises, Is the cause of this the enlargement of the heart or the contraction of the lung ? If the first were the case, a serious condition of the heart would have to be admitted.

The Elevation of the Diaphragm.—But we find here a condition which makes it plain that in our patient the heart-dulness is increased without any hypertrophy of the heart itself. We find, namely, an elevation of the diaphragm. We find in both sides of the thorax the explanation of this symptom. We have shown that the lung is one intercostal space and one rib too high, the liver-dulness on the right side being in the parasternal and nipple lines, at the upper border of the fifth rib. On the left side, instead of uniting with the tympanitic sound of the stomach at the seventh rib, the clear lung tympanitic note is found in the fifth intercostal space, except in the region of the heart. Besides, we find the apex-beat one intercostal space too high. There can be no doubt, therefore, that the diaphragm is elevated.

Cause of the Elevation of the Diaphragm.—To account for this elevation, our attention is first directed to the condition of the abdomen. There is no particular distention: its conformation is normal. The tension of the abdomen is not increased, as is readily seen by laying on the hand. The cause of the elevation of the diaphragm must be sought for in another source. There is no reason to believe that there is an enlargement of the upper part of the liver, as is seen in certain diseases of that organ, as abscess or echinococcus. Contraction of the lung resulting from fibroid thickening after old inflammatory processes is not present, nor is adhesive pleuritis. The existence of a loud percussion-note and vesicular breathing over both lungs testifies to their condition. In the deep inspiration which we now ask the patient to take, the lung and the border of the liver on the right recede to the upper border of the seventh rib,—that is, two ribs lower,—and on the left the heart-dulness becomes as small as in the healthy person under the same circumstances. The lungs have, therefore, thoroughly proved their power of expansion. When the lungs are apparently abnormally contracted and the diaphragm is drawn correspondingly farther upward, and yet both are normal, we can explain the condition only as the result of an abnormal type of respiration. In fact, this type of respiration has been observed in many cases of chlorosis,—a somewhat quickened but superficial breathing,—and it is reasonable to expect that the lung, by a long continuation of this form of breathing, will become retracted, which condition, naturally, can be detected only by an examination of the border of the lung. You will find this superficial breathing in all cases of severe chlorosis, especially where the patient has lain in bed for a long time. When the patient, on the other hand, has not been confined to bed, this condition will be less frequently found. You

will find, if you give your attention to this detail, that the elevation of the diaphragm disappears as the patient grows better.

The Influence of an Elevated Diaphragm upon the Position of the Heart.—As soon as we discover the high position of the diaphragm we can explain the increased heart-dulness and the outward displacement of the apex-beat. You find in all books on physical diagnosis that the heart is more closely pressed to the anterior thoracic wall. In most cases where an elevation of the diaphragm exists it is caused by a pressing up of the contents of the abdomen, as in pregnancy, tympanites, or ascites. The same anatomical condition must be produced by insufficiently deep inspiration in the thorax, with shrinking of the lung, as is seen in our patient. Retraction of the borders of the lung and the high position of the diaphragm explain the form and extent of the heart-dulness. These conditions are here, widening out to right and left, and an elevation of the upper border (third rib instead of fourth).

Further, the position of the apex-beat to the left is explained by the fact that the base of the pericardium, which is found by the average from the examination of many cases to rest upon the diaphragm, would be carried upward only a little, since the middle portion of the diaphragm, held down as it is by its close connection with the vascular trunks, would be less movable than the lateral portions. The movement of the heart by the raising of the diaphragm must, therefore, be greatest at the point farthest removed from the middle; that is, at the apex. The heart would be rotated on an axis which is antero-posterior, the apex describing an arc which is not only from below upward, but also from within outward. We find, when we have diagnosed the condition produced by an elevation of the diaphragm and the displacement of the apex towards the left, even as little change from the dilatation and hypertrophy of the left ventricle as is found in pregnancy.

Evidently the rotation of the heart upon an antero-posterior axis, through the elevation of the diaphragm, is not the only alteration in position which the heart makes. It has already been shown that the heart leans strongly forward. The cause of this forward movement is explained by the greater bending of the left portion of the diaphragm during its change of form than of the right portion, and its consequent action upon the heart. The greater pressure is from behind and to the left, so that the heart is also rotated a little upon its long axis. The portion that extends outward towards the left would be pressed forward; that is, the apex, the anterior border of the left ventricle, a portion of

the left auricle, the orifice of the arteria pulmonalis, and the arteria pulmonalis itself. Because of this we find an exceedingly strong apex-beat. The apex is here entirely free from lung ; and, besides, we find a full and easily-felt pulsation of the pulmonary artery. The portion of lung that lies between the pulmonary artery and the thoracic wall is thinner than normal. A careful examination of this spot shows a distinct upheaval and sinking of the intercostal space. On the other hand, every short diastolic action which the movement of the pulmonary valves makes cannot be perceived. This is a noteworthy fact, since it shows that the impulse in the region of the pulmonary artery is not perceptibly heightened ; otherwise, with the superficial position of the artery, the recoil of the blood must be clearly felt.

The Influence of the Elevation of the Diaphragm upon the Results of Auscultation of the Heart.—For the same reason, the deductions from auscultation are to be modified. The second pulmonary sound is louder than the second aortic ; this difference is very marked, as great as we find it in the failure of the mitral valve. Yet I must warn you as to the increase of the second pulmonary sound in these cases : do not mistake it for increased pressure in the region of the pulmonary artery in your diagnosis, and thereby contradict the result of palpation. Then it is clear that an increase of the second pulmonary tone can come about in two different ways : (1) when it is really louder than the aortic sound ; (2) when the attendant condition is more favorable for the arteria pulmonalis than for the aorta. The latter is true in those cases in which the orifice of the pulmonary artery approaches the thoracic wall, while the overlying aorta, over which we hear the aorta sounds, through the rotation of the heart upon its long axis, is somewhat farther removed from the thoracic wall. On that account we hear over the aorta both tones softly, while over the pulmonary artery both the systolic and the diastolic sounds appear very loud. The understanding of these conditions—namely, the simultaneous *systolic and diastolic* strengthening of the pulmonary tones—is important, and would in other cases besides chlorosis help to a better understanding of the differences in sounds.

In order to confirm the above, we should not forget the other points over which the second tone of the heart can be heard,—that is, over the apex and the fifth costal cartilage. It is already known that the diastolic sound which can be heard at this point of the thorax is the result of the valvular closure. You must in all cases of mitral stenosis, mitral insufficiency, and other diseases in which there are pressure-symptoms in the pulmonary circulation and increase of the

second pulmonary sound, remember that the second sound over the tricuspid valves is louder than at the apex; and, further, that in most cases the second sound over the tricuspid is louder than the first at the same place. The second sound here at the apex laps over the second tone on the tricuspid, and this is less than the first sound in intensity.

Conclusions.—We come to the conclusions that the changed position of the apex-beat, the strong heart-impulse, the perceptible pulsation of the pulmonary artery, the loud pulmonary sounds, and the increased heart-dulness, are explained by the retraction of the lung margins from the heart, and by the elevation of the diaphragm; and that we are not justified in allowing ourselves, because of these symptoms in connection with the systolic murmur, to make a diagnosis of mitral insufficiency.

As you see, we base our diagnosis entirely upon objective examination. We do not need to infer from past experience with chlorotic patients that there is never any physical change in the heart. This is always important, as it confirms our diagnosis and excludes the supposition that perhaps she had a definite lesion of the heart-valves as a result of the articular rheumatism. Before we make our comparative conclusions between the two cases, I should like to call your attention to two symptoms which we observed in the arterial system of our chlorotic patient.

I. *The Quality of the Pulse in the Radial Artery.*—The pulse is full, soft, and dicrotic. You will not find such a pulse in every case of chlorosis. You will not observe it if you make the mistake of confusing it with chronic cases of anæmia and oligæmia which have originated in childhood in a hyperplasia of the arterial system (Virchow); also in true chlorosis the dicrotic pulse is not always found; but when you have a case before you where the finger is on the pulse of a strong and well-nourished girl suffering from an acute and severe chlorosis, then you will always have the chance to observe a full dicrotic pulse. We will not fail to recognize both these appearances as signs of a marked dilatability of the vessels, or, in other words, of atonicity of the arteries.

II. *The Quality of the Sound-Symptoms in the Arteria Cruralis.*—It is well known that normally, by carefully applying the stethoscope, one hears either nothing at all or an arterio-diastolic tone; on applying the stethoscope with more force, one hears an arterio-diastolic stenosis murmur; and by still further pressing the stethoscope, one hears the so-called pressure-sound. Here, in this chlorotic girl, we can perceive,

as any beginner can distinguish, two distinct sounds during one pulsation. With this, however, we ought not to be satisfied, as in the crural artery there are several kinds of double sounds.

The phenomenon of double sounds is not infrequent. It was first observed in cases of aortic insufficiency; later, in mitral stenosis, in anæmia, in pregnancy, in fevers, in contracted kidney, in arterio-sclerosis, and in chlorosis.

I have for a long time observed the symptoms, and find that there are three kinds of double tones in the arteria cruralis:

(a) A double arterio-diastolic sound. The sounds generally follow quickly one upon the other; the first is not finished when the second begins; there is a separation as well as a doubling. This form is found in mitral stenosis, in saturnism, in chronic contracted kidney, in arterio-sclerosis, and often in pregnancy.

(b) A simple arterio-diastolic followed quickly by an arterio-systolic sound. The second sound begins immediately, or after a trifling pause, after the first sound. Often one can notice only that he has to do with two sounds, and cannot determine the quality of them. This form is found in aortic insufficiency, and in some cases of very high fevers.

(c) Simple arterio-diastolic and delayed arterio-systolic sounds. In these cases the pause is longer, even longer than that between the first and second heart-sounds. This condition is, therefore, very easy to diagnose. This form is found in severe anæmia, in chlorosis, in pernicious anæmia, in high fevers, seldom in pregnancy.

With this last-named form we have to do here. You can see by the collected evidence that we have here such a condition as is shown by the tension of the vessels.

In the following table I have summarized the symptoms which we have found in the circulatory system. A further explanation of this table is not necessary. The similarities, as well as the dissimilarities, in the symptoms in mitral stenosis and in chlorosis with elevation of the diaphragm are both shown. The comparative value of the several symptoms in diagnosis can be seen by reference to the text.

A Schematic Illustration of the Diagnostic Symptoms in Mitral Insufficiency and in Chlorosis.

	Mitral Insufficiency.	Chlorosis with Elevation of the Diaphragm.
Position of the diaphragm.	On both sides at the sixth rib.	On both sides at the fifth rib.
Apex-beat.	Fifth intercostal space, one and one-half centimetres left of the nipple-line. Covered by lung.	Fourth intercostal space, one and one-half centimetres left of the nipple-line. For the most part uncovered by lung.
Orifice of the pulmonary artery.	Closure of the valves can be felt. Pulsation of the pulmonary artery cannot be seen.	Closure of the valves cannot be felt. Pulsation of the pulmonary artery can be seen.
Limits of heart-dulness.	Above: fourth rib. Left: nipple-line. Right: middle line. Below: sixth rib.	Above: third rib. Left: one centimetre left of nipple. Right: middle line. Below: fifth rib.
Auscultation of the heart:		
a. Apex.	Systolic murmur, second sound.	Systolic murmur, second sound.
b. Pulmonaris.	Systolic murmur increased; second sound.	Systolic murmur, second sound.
c. Aorta.	Clear sound.	Systolic murmur; second sound is softer than at the pulmonary artery.
d. Tricuspid.	Clear sound; the second is louder than the first sound.	Systolic murmur with first sound; second sound, but softer than the first
Radial pulse.	Moderately accelerated. Indication of dirotism.	Moderately accelerated. Di-crotic.
Crural artery.	One sound.	Two sounds.
Jugular vein.	°	Venous souffle.
Crural vein.	°	° (Often venous souffle.)

ACUTE PLEURISY WITH EFFUSION; INTERSTITIAL PNEUMONIA (CHALICOSIS), WITH ENCYSTED AND PROBABLY INTERLOBAR LOCULATED PLEURISY.

CLINICAL LECTURE DELIVERED AT THE PHILADELPHIA HOSPITAL.

BY J. M. ANDERS, M.D., Ph.D.,

Professor of Practice in the Medico-Chirurgical College; Visiting Physician to the Philadelphia Hospital, etc.

GENTLEMEN,—Those of you who were here at my last clinic will recall the case I then showed you, one of acute pleurisy with effusion. We will call attention once more to the chief points in the clinical history of the case. Man, aged thirty-seven years; laborer by occupation; nativity, Italian. He had some of the diseases of childhood, followed by an attack of malaria, but since then has been in good health until the present attack, which began December 23, 1893. The onset was marked by a severe chill, followed by high fever, intense headache, and general muscular and bone pains. A few days before admission he was seized with a stitch-like pain in the region of the right nipple, extending to the back, and accompanied by dyspnoea and cough, with the expectoration of a scanty amount of mucus. On being admitted to the institution (January 4, 1894) the countenance was flushed, respirations were shallow and rapid, showing marked dyspnoea, and a hacking cough with little expectoration was present. Further examination at the time of admission revealed a right-sided pleural effusion, the liquid rising to a level anteriorly with the nipple and posteriorly with the inferior angle of the scapula. Last week, on making an examination, the fluid still arose to the nipple-line with the patient in a sitting posture, and changed on changing his position. At that time the differential diagnosis, prognosis, and treatment were spoken of. I wish to-day, however, to add a few words as to the treatment in cases of sero-fibrinous pleurisy. As the effusion is due to an inflammation and not to a simple transudation, reduce the inflammation

of the pleura by means of mild diaphoretics and diuretics, together with repeated small doses of salines, sufficient to cause moderate purgation. Opium and quinine are two remedies which control inflammations of serous membranes, the former being given in the form of suppositories or hypodermically, and the latter in divided doses, sixteen to twenty grains in twenty-four hours. In this patient, the temperature dropped to normal last week for the first time. In many cases, after the fever has entirely disappeared, the amount of fluid in the chest remains the same, and then the indications for paracentesis are to be considered. These may be properly subdivided into two classes or considerations.

First, during the acute stage: (a) To save life, and not to get rid of the fluid. (b) When one pleural sac is completely filled, as shown by dulness on percussion reaching upward to the clavicle, or when Skoda's resonance extends downward only as far as the second rib or interspace, in which case there is considerable intra-thoracic pressure, this being always an indication for aspirating. If hyper-resonance extends lower, reaching the third rib or interspace, it is well to hesitate, as the danger from intra-thoracic pressure is not so great, and the fluid may be finally absorbed. (c) Marked displacement of the heart, with the development of one or more murmurs, may occur, and denotes the indication for immediate aspiration. Distortion and compression of the great vessels from pressure of the fluid take place, which disappear as the pressure is removed by withdrawal of the fluid. (d) In double pleuritis, if both sides are filled one-half with liquid, aspirate, as sudden death may occur from the rapid filling of one side. (e) Always watch the unaffected side, and detect the first signs of involvement. If moist râles, ægophony, broncho-vesicular breathing, and impaired resonance appear, aspirate immediately, stimulate the heart, and apply dry cups over the affected area. The risk in allowing the fluid to remain is too great. Should serious symptoms arise during the acute stage, such as orthopnoea or a tendency to syncope, aspirate and withdraw a portion of the fluid.

Second, in afebrile or subacute cases, when should aspiration be performed? When nature makes no attempt at absorption. At the time the temperature becomes normal a thorough examination should be made, and the exact amount of fluid in the chest ascertained. If the quantity be not diminished in one week after the drop to normal, aspirate, withdrawing a limited amount. In cases where there is absence of temperature from the beginning, withhold operating for about three weeks, but do not wait longer; the elasticity of the lung, if compressed

too long, will be destroyed ; the latter will not regain its function, and dangerous sequelæ may result. The medical treatment in this case consisted of five grains of potassium iodide, with ten minims of the syrup of ferrous iodide, given four times daily, to promote absorption. This combination has been much used, and rarely fails to produce some effect in lessening the amount of fluid. On making an examination at this time, I find the patient's general condition comfortable, the dyspnœa much less marked, and the cough much improved. The flatness does not extend as far upward as the nipple, both anteriorly and laterally, showing beginning absorption. The indications for aspiration are, therefore, not present, and we will continue the internal treatment, and notice the patient's condition one week hence.

. The next case I have to show you is most interesting : it is similar in some respects to the one you have just seen, although not nearly so typical in character. Male, aged fifty ; occupation, brickmaker since eleven years of age. One parent and one sister are dead ; causes of death not known. His remaining parent and another sister are living and well. When a child he had measles and whooping-cough, and in 1876 a severe attack of small-pox, from which, however, he fully recovered. Two years ago he noticed for the first time slight dyspnœa on exertion, accompanied by some cough with little expectoration. His general health, he states, was good at this time, and he did not lose flesh. The cough, however, continued, and one year ago last December he had a severe attack of influenza, followed by right-sided pleurisy with effusion, and was quite ill for some time, but finally recovered, and remained in good health until September, 1893, when he caught cold and the dyspnœa returned, accompanied by persistent cough with muco-purulent expectoration. He continued to work, and one month ago the symptoms became much intensified. Despite this he would not give up work until two days before admission. When I first saw him his face was flushed, dyspnœa was marked, and persistent cough was present, with scanty expectoration. The temperature was irregular and sub-remittent in character, reaching 101° in the morning and rising to 102° or higher in the evening. Physical examination of the chest in front showed diminished expansion on the right side, the supra- and infra-clavicular fossæ being well marked, and the respiratory movement on that side in an upward and downward direction. Anteriorly on the left side expansion was good, the movement being upward and outward. The apex-beat could be seen in the fifth interspace, but was displaced nearly one inch to the right. The impulse was feeble. Posteriorly on the right side there was retraction, beginning at the angle of the

scapula and extending laterally, together with diminished expansion on that side, some movement being noticed over the base.

Palpation.—On the left side, anteriorly and posteriorly, tactile fremitus was good throughout. Over the upper half of the right lung anteriorly fremitus was much diminished or entirely absent, being relatively more marked over the right base. Percussion over the upper third of the right side anteriorly showed flatness with impaired resonance over the lower two-thirds. Posteriorly flatness extended down to the spine of the scapula, and from that point to the base of the right lung there was dullness; over the extreme base, impaired resonance. Percussion over the left side anteriorly and posteriorly showed extra resonance throughout. On auscultating over the right lung anteriorly, the breath-sounds were impaired down to the nipple; below that friction râles could be plainly heard, accompanied by a feeble respiratory murmur. On the same side posteriorly, above the angle of the scapula, breath-sounds were entirely absent; below that the sounds were heard feebly, together with a few friction râles. Four days later the physical signs were recorded as follows. Posteriorly over the lower half of the right lung increased tactile fremitus, with impaired percussion resonance, extending to the middle third. Above the angle of the scapula, where the breath-sounds were formerly absent, broncho-vesicular breathing could be heard. The diagnosis of plastic pleurisy with effusion, which had largely disappeared, was then made. One week later, practically the same signs were discovered posteriorly. Anteriorly on the right side percussion showed flatness extending to the base of the lung in front; over the upper third of the lung vocal fremitus was entirely absent. The breath-sounds about the region of the nipple were also absent, no friction râles being heard. From the limited area of dullness not changing with the position of the patient, in conjunction with the other physical signs, the effusion was thought to be an encysted or sacculated one; hence the exploring needle was used, which confirmed the diagnosis. In cases of this character, where some doubt exists as to the condition present, the exploring needle affords the only sure means of establishing a positive diagnosis. In this case the needle was passed between the third and fourth ribs, in a line drawn obliquely outward and upward from the nipple to the apex of the axilla. When first examined, if you will remember, the area of flatness was circumscribed to the right apex, but to-day, on percussing, we have flatness extending to the base of the lung. The question now arises, Is this a monolocular or a multilocular cyst? which can be decided only by aspirating. In order to find whether the cysts, when

multiple, communicate with one another, we should aspirate first low down in the sac, and notice whether the liquid disappears from above. In multilocular pleurisy the cysts often communicate, although separate cysts may occur having no connection with one another. The flatness obtained anteriorly high up on percussion it was thought might be due to a thickened pleura, as the presence of a loculated effusion in that situation is rare. The marked retraction extending downward to the third rib would also denote chronic pleurisy with numerous fibroid adhesions. The patient has evidently had an acute attack in which the fluid has been confined within these fibrous bands, forming cysts which probably do not communicate, since they developed at two different periods. In cases of recent pleurisy with effusion, adhesion may develop, but this occurrence is rare. If we trace the direction of the effusion, beginning in front, we have dulness over the mid-sternum, extending to the right and ending at the anterior axillary line, percussion resonance being good in the mid-axillary region. Posteriorly on the right side there are increased tactile fremitus, good percussion resonance, and distinct vesicular murmur, all of which exclude the presence of an effusion. Compression of the lung from liquid may also give rise to symptoms, impaired percussion resonance and feeble or absent vesicular murmur, which, however, tend to disappear when the pressure is removed. Unless the sac be two-thirds full, no positive pressure is exerted upon the lung, although in cases of encysted pleurisy actual positive pressure exists earlier than otherwise. In this patient the amount of intra-thoracic pressure is not great, the fluid being confined within the fibrous adhesions, though the pressure may be considerable in the cyst itself. If the lung substance were compressed, we should have diminished breath-sounds, but no bronchial breathing with retraction of the chest walls, and no displacement of the apex-beat to the right, as exists in this case. Reviewing the clinical history and physical signs, I think we can safely say the condition posteriorly is one of cirrhosis of the lung, associated with chalicosis, of which I have lately seen one other case. The patient has been a brickmaker for thirty-nine years, inhaling particles of dust, and right here the question presents itself, Why did not infection take place before this time? Simply because the natural scavengers of the air-passages removed the dust. The mucous cells and phagocytes take up the particles, while the ciliated epithelium sweeps them in a position to be expectorated. If the dust be too thick and insoluble matter be present, it enters the submucosa, is taken up by the bronchial glands and lymphatics, and the fibrous or connective tissues are infiltrated. Mechanical induration

ensues, and a fibrous overgrowth is the result. In this case there is a history of chronic bronchitis, together with dyspnoea, the latter being an invariable symptom of cirrhosis. We also have here fever resembling in variation that of fibroid induration, being 100° to 101° in the morning, and rising to 102° or higher in the evening. The physical signs in this case also show posteriorly retraction from the spine of the scapula downward, and laterally on the right side, together with limited expansion. The diagnosis of cirrhosis should not be made without the presence of retraction, although this may occur in one other condition,—that of adhesive pleurisy. In this case also there is increased tactile fremitus over the lower two-thirds of the right lung, together with broncho-vesicular breathing, whereas in plastic pleurisy we have diminished fremitus with impairment or entire absence of breath-sounds and frequent presence of harsh friction-sounds. On percussion in this case there is flatness above down to the spine of the scapula, and from that point to the lower lobe of the right lung, dulness, the sound being of a peculiar wooden quality, and accompanied by a sense of resistance imparted to the fingers, which is peculiar to this condition.

In reviewing the signs, we have retraction of the chest walls, displacement of the apex-beat *towards* the side affected, increased tactile fremitus, showing some degree of consolidation of the lower and a portion of the middle lobe posteriorly, together with wooden dulness and exaggerated vocal resonance, almost amounting to bronchophony, all indicating consolidation of the lung. Mucous râles and friction crackling at the end of inspiration are also heard in this case, showing the existence of dry pleurisy secondary to a chronic bronchitis. The latter often leads to pleurisy. In diagnosing cases of this kind we have to think of and exclude other conditions which may give rise to some of the symptoms and physical signs present. *Cancer* of the posterior portion of the lung may be confounded with fibroid induration, but in this the clinical history is different, and, if the disease be far advanced, cancerous cachexia will be present. Physical examination shows very slight retraction of the chest walls, or perhaps some bulging of the intercostal spaces, increasing with the size of the tumor. The bronchial glands and lymphatics also become enlarged and undergo cancerous change. Moreover, carcinoma of the lung is usually secondary; among the primary seats being the mammary gland, the liver, the œsophagus, and the stomach. As the disease progresses, cachexia develops, with all its attending phenomena. In the patient before us the diagnosis of cancer can be positively eliminated.

Fibroid Phthisis.—In this the physical signs may exactly resemble

those of cirrhosis of the lung, and the therapeutic test—that of giving small and repeated doses of tuberculin—has to be relied upon. The sputa in such cases should be examined repeatedly for the presence or absence of tubercle-bacilli. Until late in the disease the differential diagnosis by means of physical examination cannot be established. Such cases as this, in my opinion, almost invariably terminate in phthisis, although many authorities differ with me on this point. Intercurrent acute pleurisies take place, and these favor the development of pulmonary tuberculosis.

The prognosis in this case is good as to life. The patient may live many years, but will be prone to attacks of pleurisy, broncho-pneumonia, gangrene, and other dangerous conditions of the lung. The treatment is merely symptomatic and hygienic, so far as the element of fibroid induration is concerned, consisting in a carefully regulated diet, sufficient sleep, abundance of fresh air, friction to the skin with a limited amount of exercise, and other hygienic measures to improve the general health and to arrest or limit the process of connective-tissue formation.

In a multilocular pleurisy the indications for aspiration are different from those of a general pleurisy with effusion. Always operate early, as there is some danger of the sac rupturing, or of great cardiac displacement where the fluid is confined to the anterior part of the chest. Intra-thoracic pressure in this instance is slight, as shown by the degree of elasticity of the lung remaining. Always determine the extent of the effusion. Now as regards the *modus operandi* in thoracocentesis. The needle should be limited in size, being from one-half millimetre to two millimetres in diameter. See that the valves of the syringe and the stopcocks are in working order and adjusted properly before using, as tedious and sometimes serious delay has been occasioned by neglecting this minor detail. The patient should be in a semi-recumbent position, with the head and shoulders elevated, so that he can lie down easily and with little movement. The operation is not a serious one, nor, if performed properly, painful, and the patient may partake of a meal preceding it without harm following. After the needle is withdrawn, he should lie perfectly quiet for two hours, and should not be allowed out of bed for the following twenty-four hours. The next question that arises is, where to puncture. If the effusion is large, almost filling the chest, aspirate high up, the object being to draw off some but not all of the fluid: on the right side, in the fifth interspace, mid-axillary line, if full, and on the left side in the sixth interspace. If the effusion fill only two-thirds of the pleural sac, aspirate in the sixth interspace on the right side, and in the seventh interspace on the left. By as-

pirating in the seventh interspace the liver and diaphragm have been touched, with bad consequences. In a localized pleurisy, operate over the lower third of the sac. A vacuum having been produced in the bottle, the stopcock admitting air from the bottle to the syringe is turned off, and after the introduction of the needle another stopcock, connecting the tube with the bottle, is opened, and the vacuum present exerts a suction action on the fluid in which the needle dips, drawing it into the bottle. All aspirators work on this principle. The assistant having drawn the skin tense by placing his finger over the rib above the interspace to be tapped, the operator grasps the needle with his index finger placed one inch from the point, in order to guard against its going in too far, and with a quick push (not a boring motion) he directs the point slightly inward and downward, allowing the liquid to drain into the bottle. Great caution should be observed to have the needle and index finger of the operator, as well as the skin over the seat of operation, antiseptically clean, in order to avoid converting a serous into a purulent effusion. In pleurisy with effusion the best situation for making puncture ordinarily is a little posterior to the mid-axillary line, although if the sac be full the latter may be chosen. Always remember in aspirating to hug the *upper* border of the rib *below* the interspace to be punctured. In this case fluid is present, showing the existence of an encysted pleurisy. As these cases are apt to be multilocular, aspiration at several points may become necessary. The fluid should be allowed to flow off slowly, and after four or five ounces have been withdrawn, the flow may be checked for a few minutes and then allowed to continue, thus inviting the lung to expand, though slowly. In aspirating a pleural cavity filled with liquid, two pints may be withdrawn, but not more. After withdrawal of the needle, the skin, which has been held tense by an assistant, is dropped, completely covering the opening. In the case of a recent cyst, if the fluid contained does not exceed ten or twelve ounces, it may all be removed. In this case we now remove nine ounces, and you will observe the flow has stopped. If, during the process of aspirating, cough, dyspnoea, or a tendency to syncope should develop, withdraw the needle immediately. In the case before us it is difficult to say how much of the consolidation was due to compression from the effusion and how much to fibroid induration. After the withdrawal of the fluid the lung expands slowly. On percussing, I find that the flatness from above down to the third rib, which was present on admission, still exists, which flatness makes us suspect the presence of another monolocular cyst, and on aspirating fluid is present. This probably is

an interlobular cyst, produced by the inflamed pleura dipping between the lobes ; these cysts contain usually but a small amount of fluid, and do not cause much bulging of the intercostal spaces ; in this case there is actual retraction. It is impossible by physical examination to distinguish definitely between an interlobar and an encysted pleurisy.

Finally, there are certain contra-indications for aspiration which must be borne in mind. The presence of shock or collapse is always a contra-indication, as is also an excessively feeble condition of the system, in which case the shock of the operation cannot be well borne. Croupous pneumonia, if ascertained, should always contra-indicate aspiration, as cases of this kind may prove rapidly fatal. Among other sequelæ, albuminoid expectoration may occur. The respirations become rapid and jerky, and there is a sense of oppression in the chest, with excessive cough and rapid serous expectoration, reaching one or two pints in as many hours. The patient sometimes recovers rapidly, but the condition is quite as apt to terminate fatally. The symptoms are due to congestion of the lung followed by temporary œdema. Death from syncope may occur after the withdrawal of a large pleural effusion. The heart, being much displaced by the effusion, cannot accommodate itself to the sudden change of position, and death from pulmonary embolism is not uncommon. During its displacement the circulation is depressed, but as the fluid is removed the organ returns to its normal position, and the increased strength of the current washes an embolus into the circulation, which lodges in the pulmonary artery, producing instant death. Those cases invariably do best in which but twelve or fourteen ounces of fluid are removed at the first aspiration, which may be repeated, if necessary, in two or three days.

PERNICIOUS ANÆMIA.

CLINICAL LECTURE DELIVERED AT GUY'S HOSPITAL, LONDON.

BY W. HALE WHITE, M.D., F.R.C.P.,

Physician to Guy's Hospital.

GENTLEMEN,—We have recently had in the hospital a man who died from pernicious anæmia, and I am able to show you his viscera. I shall also in a few minutes bring into the clinic a woman who is a well-marked example of the disease, and in Stephen ward you can see a man who exhibits the characteristic symptoms. We ought, therefore, this afternoon to be able to learn a good deal about this rare malady.

The clinical history of the fatal case is as follows: On admission, March 8, he was fifty-five years of age. He contracted gonorrhœa and syphilis when young; otherwise he had had no illness. He had not suffered from diarrhœa or sickness.

Present Illness.—Eight weeks ago he began to feel weak and lose color. Five weeks ago the dyspnœa and weakness became so marked that he had to take to his bed. At this time the ankles swelled, his pallor increased, and he became so weak that he was unable to stand.

On Admission.—The whole of the body is of a well-marked lemon tint, but there is no jaundice. There is a flush over each malar bone, All the visible mucous membranes are very pale.

Circulatory System.—There is no evidence of cardiac dilatation. There is a loud blowing systolic murmur, best heard at the apex, and traceable from there in all directions. Pulse 80, regular, feeble, small, compressible. Red corpuscles, twenty-four per cent.; hæmoglobin, eighteen per cent.; no leucocytosis.

Respiratory System.—This appears normal.

Alimentary System.—Tongue and mouth very pale; appetite bad; stomach a little distended; no vomiting; motions normal. The edge of the liver can be felt three-quarters of an inch below the ribs. The spleen cannot be felt.

Nervous System.—Normal. He is sometimes giddy.

Eyes.—In both eyes there are several well-marked hemorrhages which follow more or less the course of the vessels; the inner side of the right disk is a little blurred.

Urine.—Distinctly dark, acid, no deposit; specific gravity 1012; free from blood, albumen, sugar, or bile.

He was treated with full diet and five minims of liquor arsenicalis three times a day.

May 27.—Patient weaker and somewhat drowsy. He has been kept on arsenic, except when the increase to seven minims seemed to cause diarrhœa. The liver is now three inches below the ribs.

June 15.—The dyspnœa is very marked. There is Cheyne-Stokes breathing. The liver is within an inch of the umbilicus. There is a pericardial rub.

June 17.—He died comatose.

Autopsy.—*Heart.*—Recent pericarditis. Well-marked tabby striation.

Lungs.—Fifteen ounces of clear fluid in each chest. Lungs anæmic.

Spleen.—Soft; appeared normal.

Liver.—Sixty-six ounces; appeared normal.

Kidneys.—Edematous and tough.

Bones.—Normal.

All the other parts of the body had nothing visibly amiss with them except anæmia. The liver and kidneys, as you can see by the pieces of the organs I show, stained blue with ferrocyanide of potassium and hydrochloric acid, and the liver gave a black color with ammonium sulphide. The spleen also gave the Prussian blue reaction.

Subsequent analysis showed that the liver contained when dried, freed from blood, and analyzed with the greatest care, 1.038 per cent. of iron.

(The normal percentage of iron in the liver is 0.083.)

The spleen, dried and freed from blood, contained 0.301 per cent. of iron.

(The normal percentage of iron in the spleen is 0.171 per cent.)

State of the Blood during the patient's stay in the hospital:

Reaction.—The alkalinity of the blood was tested on March 14 with graduated litmus papers of different degrees of acidity. It could not be made out that the patient's blood differed from that of a healthy individual, but the test appeared far from delicate.

Specific Gravity.—On June 10 this was taken in a mixture of chloroform and xylol, and was found to be 1042.

The following chart shows the proportion of hæmoglobin and red blood-corpuscles.

CHART 1.

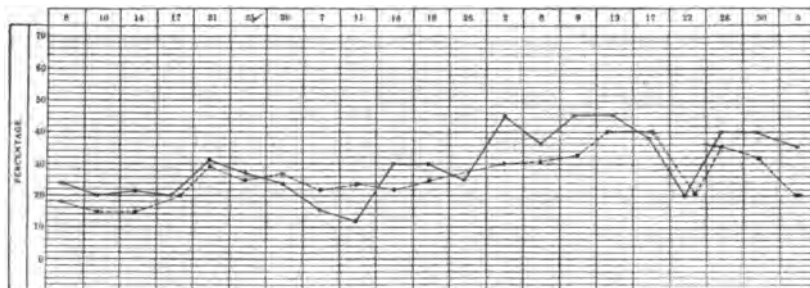


Chart of the blood of Richard Forge (Case I.). Black line shows the percentage of red blood-corpuscles; broken line, percentage of hæmoglobin.

The Urine.—This was carefully examined every day, and the following is a summary of the results.

Quantity.—This varied, but not more than in health, and was usually about two pints.

Specific Gravity.—This was nearly always between 1010 and 1012.

Albumen.—None, except a trace the day before death.

Bile.—None.

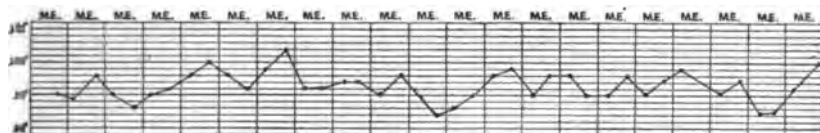
Indican.—This gradually appeared as the urine got darker from April 14, and increased until at the end of the case there was a considerable amount.

Color.—The color, from admission up to April 1, was decidedly dark, and the urine was clear. From April 1 to April 14, color normal; urine not clear. From April 14 it gradually passed through the stage of high color to darkness, so that by April 25 it was moderately dark and clear. On May 1 it was dark and clear. On May 18 it was very dark and clear, and it remained in this condition till the death of the patient. The specimen before you shows very well the dark color. Whenever the urine was dark or very dark, the urobilin band was broad; in fact, the width of the band increased proportionally to the darkness; on no occasion, although repeated examinations were made, could any accessory spectral bands be detected, the only one visible being the broad urobilin band, which you can see in the present specimen. On several occasions the color was observed in each specimen, passed at different times of the day, and it could not

be made out that the time at which the urine was passed made any difference in the color.

Temperature.—This was raised during the whole of the patient's stay in the hospital: usually it was a degree or two above normal, higher in the evening than in the morning. The following chart shows the temperature during the first three weeks.

CHART 2.



Temperature chart of Case I.

Microscopical Examination of the Viscera.—Pieces of the organs which had been stained with ferrocyanide of potassium and hydrochloric acid were cut in sections, and you can examine some kindly exhibited by Mr. Steward under the microscopes on the table. You will observe that in the liver the deposit of Prussian blue is in the outer two-thirds of the hepatic lobule, and is most abundant in the hepatic cells. In the kidney it is in the cells of the convoluted tubes, with a little lying free in the lumen of the tubes.

CASE II.—Annie G., aged about forty-eight, admitted March 18, 1893. In 1866, when at Constantinople, she had a slight attack of cholera, and has been liable to summer diarrhœa ever since. She has also suffered from constipation.

Present Illness.—Four and a half years ago the menopause commenced. Since then she has suffered from shortness of breath and palpitation. She has had vomiting and diarrhœa, bearing no relation to food. She was in the hospital under Dr. Taylor for four weeks, at the end of 1892. Then she was of a lemon color, was slightly deaf, had a hæmic murmur and a venous hum. Red corpuscles, twenty-two per cent.; hæmoglobin, fifteen per cent. Urine, light brown, with a trace of albumen and a broad urobilin band; eyes normal. Temperature every evening over 100°. She improved somewhat on arsenic.

On Admission.—She says that since she has been out she has been very weak and her feet have swelled. For the last fortnight she has had vomiting and diarrhœa, ringing in the ears, giddiness, headache, and severe palpitation. Now she is, as you can see, of a lemon tint, and extremely emaciated. There are a few subcutaneous hemorrhages.

There is a loud hæmic murmur and venous hum, and the pulse is feeble. Respiratory system normal. Both optic disks blurred.

The case may be summed up as follows. The optic neuritis became more marked. There was diarrhœa on March 24, April 6, and May 2, and on these occasions the urine was particularly dark : one of these dark specimens I show you here. Otherwise she improved considerably. She took arsenic during the whole of her stay, and for some time large doses of β -naphthol, but this was left off, as no improvement could be attributed to it, and it made her feel sick. Oxygen inhalations were tried, without any good result. She left the hospital on May 3, but has come in again within the last few days.

State of the Blood.—The following chart shows the quantity of hæmoglobin and red corpuscles. There is no excess of leucocytes.

CHART 8.

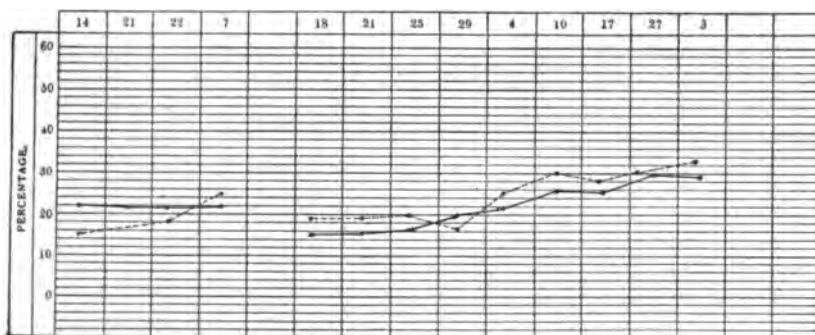


Chart of the blood of Annie Goodhart (Case II.). Black line, percentage of red corpuscles; broken line, percentage of hæmoglobin.

The Urine.—This was carefully examined every day.

Quantity.—Normal.

Specific Gravity.—Almost always between 1010 and 1012.

Albumen.—On four occasions a faint trace was detected.

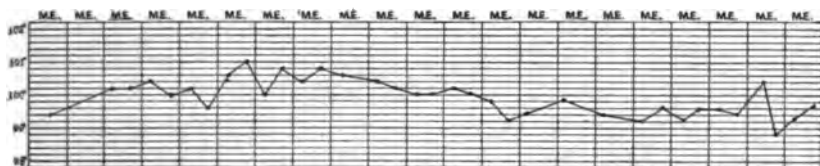
Bile.—None.

Indican.—None.

Color.—March 18–21, high-colored ; March 22, more highly colored ; March 23–30, high-colored ; April 1–5, light-colored ; April 6–8, dark ; April 9–11, light ; April 12, rather dark ; April 14–22, light ; April 23–24, rather dark ; April 25–29, light ; May 2, dark. When the urine was dark the urobilin band was particularly broad, but there was never more than one band. This can be seen by looking at the specimen I show you.

The Temperature.—This was, as the annexed chart shows, raised during the whole of the patient's stay in the hospital, and was on the whole a trifle higher than in the first case. It was usually higher in the evening than in the morning.

CHART 4.



Temperature of Case II.

CASE III.—Samuel Davis, aged forty-five, admitted December 23, 1893.

Family History.—Unimportant.

Personal History.—Is said to have had rheumatic fever twice, and dysentery at the age of thirty. Six years ago he had some severe illness, which the doctor said was cholera.

Present Illness.—In January, 1893, he had influenza, since which he has suffered from loss of appetite, with occasional days of constipation and vomiting. Early in August, the symptoms being especially bad, he was treated by a doctor, and he improved, but latterly he has been worse again. He has suffered much from weakness, palpitation, and breathlessness. Appetite poor. Occasionally his ankles have swelled.

Condition on Admission.—He is, as you can see, very pale, with perhaps a slightly yellow tint.

Circulatory System.—He suffers from palpitation. The apex is very slightly outside the normal position. There is a soft systolic murmur at the apex, and a humming murmur in the neck. The lungs appear normal. The liver, spleen, and optic disks are normal. There is some headache, giddiness, and buzzing in the ear. There are no enlarged glands. The rectum is normal. The bowels are open about twice a day.

The Urine, which I show you, is rather dark, and a band of urobilin can be seen in the same position as in the other cases; acid; specific gravity 1012. No sugar, blood, or albumen. Urea, one per cent.

Blood.—Red corpuscles, twenty per cent.; hæmoglobin, seventeen per cent. No excess of leucocytes.

Temperature.—This varies a fraction of a degree either side of 100°.

An examination of the motions did not show them to be suggestive of ulcerative colitis.

Now, the chief feature that all these cases have in common is that the anæmia is profound, and therefore it behooves us to consider what are the varieties of anæmia. They are,—

1. Anæmia secondary to some well-defined disease or condition, such as severe hemorrhage, severe long-standing diarrhœa, as in ulcerative colitis, phthisis, syphilis, malignant disease, malignant endocarditis, exophthalmic goitre, malaria, etc.

2. Anæmia due to poisons, as lead and arsenic.

3. Anæmia due to parasites which suck blood, as *Ankylostoma duodenale* and *Bilharzia hæmatobia*.

4. Primary anæmias,—so called because we do not know the cause, but what evidence we have shows that they are due to some primary disorder of blood formation or destruction. These are (a) leucocythæmia, (b) Hodgkin's disease, (c) chlorosis, (d) pernicious anæmia, and (e) splenic anæmia. Now, with regard to the diagnosis: in the first two cases we have had many opportunities of carefully examining the patients, and we could never find the slightest evidence that the anæmia was due to any of the first three groups, and therefore we were narrowed down to that of primary anæmia. Neither of the patients had any leucocytosis or any enlargement of the spleen, and consequently they were not suffering from leucocythæmia; the absence of enlargement of the lymphatic glands rendered Hodgkin's disease out of the question; the age of all three and the sex of two negatived chlorosis; the fact that the spleen was not enlarged put splenic anæmia out of court: so that we were left with the diagnosis of pernicious anæmia.

With regard to the third case, this line of reasoning renders it very probable that he has pernicious anæmia; but we must remember that the history of diarrhœa renders it just possible that he may have ulcerative colitis, though I think this unlikely, for the diarrhœa has been too slight to account for the profundity of the anæmia, and the motions are unlike those of ulcerative colitis. Also, as the patient has been so short a time under observation, it is possible that we may have failed to discover some obscure form of malignant disease or phthisis. It is very important to bear these two conditions in mind when thinking of pernicious anæmia, for they have often been mistaken for it. Lastly, when a patient who has had rheumatic fever and who has a cardiac murmur is anæmic and seriously ill, we should always think of malignant endocarditis; but in this case the duration of the illness is very much against such a diagnosis.

Now that we have arrived at a diagnosis, the next thing is to point out to you that you have in every case of anæmia two sets of symptoms to consider. First, there are those which are simply due to the fact that the patient is anæmic; and, secondly, there are those which are peculiar to the particular anæmic disease from which he is suffering, because they are caused by the same factors which produce the anæmia.

I have fastened up on the wall a list of the first group of symptoms, and you will see in the annexed table which of them are present in each of our three cases.

Symptom.	Present in Case I.	Present in Case II.	Present in Case III.
1. Pallor	Yes.	Yes.	Yes.
2. Blood-changes	"	"	"
3. Dyspnœa	"	"	"
4. Hæmic murmur	"	"	"
5. Bruit de diable	"	"	"
6. Feeble pulse	Yes.	"	"
7. Palpitation of heart	"	"	Yes.
8. Dilatation of heart	"	"	"
9. Œdema of ankles	Yes.	"	"
10. Hemorrhages	"	"	"
11. Optic neuritis	"	"	"
12. Headache	"	"	Yes.
13. Giddiness	Yes.	"	"
14. Buzzing in the ears	"	"	"
15. Coma	Yes.	"	"
16. Delirium	"	"	"
17. Dyspepsia	"	Yes.	Yes.
18. Constipation	"	"	"
19. Amenorrhœa	"	"	"
20. Rise of temperature	Yes.	Yes.	Yes.
21. Wasting	"	"	"
22. Weakness	Yes.	"	"
23. Fatty degeneration of heart (P.M.)	"	"	"

You see, therefore, that these three cases present most of the symptoms which are pathognomonic of anæmia quite independently of the cause. Of those that are absent, some, as those connected with the circulation, would certainly have been present had the patients not been kept quietly in bed; and the coma and delirium are especially characteristic of anæmia rapidly produced by sudden losses of blood.

Next we have to inquire what are the symptoms peculiar to pernicious anæmia. They are,—

First. The characteristic pallor. This is usually of a light lemon tint. The man who died showed it admirably. The woman you have seen shows it very well, and the man considerably less. Careless ob-

servers mistake it for jaundice, a mistake that can be avoided by remembering that bile stains the conjunctivæ uniformly yellow. Associated with this lemon or primrose tint is a soft, delicate-looking condition of the skin.

Secondly. The blood-changes. Earlier observers described many variations in the shape of the red blood-corpuscles as peculiar to pernicious anæmia, but we now know that there are no such alterations specially characteristic of this disease. The diminution of red blood-corpuscles and of hæmoglobin is often very profound, as in all these three cases. It is stated that the diminution of the hæmoglobin is often not so great as the diminution of the number of red corpuscles, each of which, therefore, contains more hæmoglobin than in health; but this, as our cases show, is by no means constant. There is no increase of leucocytes.

Thirdly. Hemorrhages. These are very often well marked in pernicious anæmia. They are especially met with in the retina, as in our first case.

Fourthly. Optic neuritis. This is more common in pernicious anæmia than in most other forms of anæmia. Our second case shows it.

Fifthly. Rise of temperature. It is very characteristic of pernicious anæmia that the temperature should be slightly raised; usually it is about 100°. All our cases illustrate this point.

Sixthly. Weakness. This is generally very great.

Seventhly. The urine. Much interest attaches to this, for it has been shown that in the greater number of cases of pernicious anæmia the urine is at some time or other in the course of the illness of a very dark color, as you see in the specimens before you. This darkness is all the more remarkable since in patients suffering from any other form of anæmia the urine is—unless there is some special reason to the contrary—pale, the degree of paleness corresponding roughly to the degree of anæmia. It is rare for the dark urine to be constantly present. Usually, as in our cases, it is present for a time, and then the urine is pale for some days, and then it becomes dark again, and so these irregular alternations go on. This dark color is due to a great excess of urobilin in the urine, and consequently there is a broad spectroscopic band between the blue and green parts of the spectrum, which can be seen in the specimens before you. For some time this color was stated to be due to pathological urobilin, and a three-banded spectrum was described, but this Mr. F. G. Hopkins has shown to be an error, the two extra bands being due to the presence of hæmatoporphyrin in the urine.

Pathology.—Pernicious anæmia is a disease in which all of us who are at Guy's Hospital feel an especial interest, for it was Addison who first described it, and his recognition of it as a distinct clinical entity is one of the masterpieces of the art of clinical observation. Also the publication in *Guy's Hospital Reports*, by various members of the staff, of an account of the cases that have occurred in the hospital since Addison's time has continued the work he began, and proved the accuracy of his original description.

Many physicians, and particularly some in Germany, have not fully grasped what is meant by pernicious anæmia. Addison, for clinical reasons, said that it was "a remarkable form of anæmia occurring without any discoverable cause." But it is quite clear that many writers who have described cases fail to understand this, and they detail cases of severe chlorosis, hemorrhage, etc., as ultimately becoming examples of pernicious anæmia. This is manifestly wrong. It is essential that for the case to be one of pernicious anæmia none of the usual causes of anæmia which we have put in our list should be present. No doubt pernicious anæmia has a cause, but we have not as yet been able to discover it.

Now, the first step, and a very difficult one, in the case of a rare disease, is the recognition of it as a clinical entity. Addison did this for pernicious anæmia. Hodgkin did it for Hodgkin's disease. Gull did it for myxœdema. The next step is so to advance our knowledge that we can prophesy that, if the patient has during life this or that assemblage of symptoms, a constant characteristic condition will be found at the post-mortem.

During the last few years this advance has been made in the case of pernicious anæmia, and now if you diagnose this disease during life you imply that at death it will be found that the quantity of iron in the liver is greatly increased; if at the post-mortem this is not so, your diagnosis will have been wrong, just as you would be wrong if, having diagnosed cirrhosis of the liver during life, when the patient died you should find that the liver was healthy.

The figures I have read to you show that in our fatal case there was about twelve times as much iron in the liver as normal. The excess of iron is easily demonstrated at the post-mortem, either by treating the organ with sulphide of ammonium, when it turns black, or by dipping it in a mixture of ferrocyanide of potassium and very weak hydrochloric acid, when it turns a fine blue color, owing to the formation of Prussian blue. This is beautifully shown in the sections under the microscope and in the piece of liver you see before you. Some-

times, if the increase of iron in the liver is not great, the Prussian blue does not show well till sections are cut and examined microscopically, when it is found most abundantly in the hepatic cells of the outer two-thirds of each lobule.

If, as in this case, the increase of iron in the liver is very great, some increase may be found in the spleen and kidneys, but it is never anything like as great as in the liver.

The next question is, how does this iron get to the liver? As it is so abundant in this organ, and yet is probably not formed there, for it is found only at the periphery of the lobule, it is fair to assume that it arrives by the portal vein, which supposition would explain why the iron is in the periphery of the lobule; consequently the following very plausible hypothesis has been put forward. There is somewhere in the wall of the gastro-intestinal tract a great destruction of red blood-corpuscles: this explains the anæmia. The iron resulting from the destruction is stored up in the liver, and occasionally if the amount is very great some gets carried into the general circulation, and is met with in the spleen and kidney.

Other results of the breaking up of the red blood-corpuscles are the pigment which stains the skin the peculiar lemon tint, and the urobilin which darkens the urine. It is not thought probable that the destruction of the red corpuscles takes place in the cavity of the gastro-intestinal tract, for free iron would not be absorbed, nor are the fæces black; nor that it takes place in the spleen, for the quantity of iron in that organ is not much, if at all, increased in this disease; and there is no evidence that it takes place in the pancreas. To see if any support can be lent to this view from the presence of gastro-intestinal symptoms during life, I have carefully collected the reports of all the cases of pernicious anæmia we have had in Guy's since the time of Addison. The result¹ is that forty-one per cent. gave a history of vomiting before admission, and thirty-four and a half per cent. gave a history of diarrhœa. After admission fifty-five per cent. suffered from vomiting, and forty-one per cent. from diarrhœa. Cases in which the vomiting and diarrhœa might be due to arsenic are not included in these figures. Therefore an analysis of our cases, showing that vomiting and diarrhœa are very common in pernicious anæmia, to a certain extent supports the view that the seat of the blood-destruction is in the wall of the gastro-intestinal tract.

Prognosis.—In order to gain information on this point I followed

¹ Guy's Hospital Reports, vol. xlvii. p. 149.

up cases that had been in Guy's and had been discharged as improved, and an analysis of the results shows that sometimes the patients die in a few months from the onset of the disease, as in our fatal case.

Five cases which were discharged as improved returned later to our hospital. The first left in April, but he returned in August and died. The second left in February, returned in October, and died in December. The third left in July, came back in five months, and died four months after his second admission. The fourth left the hospital on January 27, having improved; was readmitted June 12 because she had relapsed; again she improved, and left on August 7, but was readmitted October 29, and died November 20. The fifth case was in the hospital in 1887 for pernicious anæmia: he improved very much and went out. On March 5, 1889, he was readmitted for pernicious anæmia; again he improved, and went out on March 13, but on June 5 he was readmitted for pernicious anæmia, from which he died June 30, 1889. Thus we see that a very common thing is for the patients to get very much better under treatment, then to relapse after a few months of fair health, but perhaps again to get better under treatment.

This alternation is very well seen in the woman I have shown you. The usual course is for the second or third relapse to be exceptionally severe, and for the patient to die in it. Recovery is very rare; still, it does occur, and I have recorded two instances of it. One patient, though feeble, was well eleven years after the disease first came under observation. The other patient, four years after he was first seen, was in robust health.

To sum up, we may say that the prognosis is very grave, and you must be especially careful not to take too hopeful a view of the case because the patient improves under treatment, for in all probability he will soon relapse.

Treatment.—Every observer is agreed that the only known treatment which will do any good and help to stave off the end is arsenic in full doses, taken immediately after food, together with complete rest in bed for a time. Iron has often been tried, and it does more harm than good, for it upsets the digestion while it does not appear to improve the anæmia. I had an opportunity of demonstrating this in the wards some six years ago. On the supposition that possibly the cause of the breaking up of the blood in the portal area is some micro-organism, intestinal antiseptics have been tried, without, however, any good result. You will remember we could not make out that the woman you saw was any better for taking β -naphthol, one of the most powerful intestinal antiseptics.

MEDICAMENTS USEFUL IN PULMONARY TUBERCULOSIS.

CLINICAL LECTURE DELIVERED AT THE PHILADELPHIA HOSPITAL.

BY SOLOMON SOLIS-COHEN, M.D.,

Physician to the Philadelphia Hospital; Professor of Clinical Medicine and Therapeutics in the Philadelphia Polyclinic, etc.

GENTLEMEN,—I have spoken to you on a previous occasion concerning the hygienic measures to be employed in the prevention and treatment of pulmonary tuberculosis. I shall now say a few words concerning the drug treatment of that disease, merely premising that in this, as in the hygienic management of the case, each patient must be an individual and special study.

In our application of drugs we have to consider a number of points. First and most important is the nutrition of the patient. Drugs that will improve nutrition are not many, and they are familiar to you from their uses in other conditions. They are those which we call roborants, hæmatinics, tonics, nervines, and cardiants. Among them I place arsenic foremost; the second is strychnine,—not, however, in large doses. While both these drugs are given for constitutional effect, acting as they do to improve the blood and to stimulate the respiration, circulation, and organic functions generally, in the details of their use we must be guided largely by the effect upon digestion; for, after all, it is to alimentation that we have chiefly to look to preserve the strength of the patient, and to bring up his vital forces to that point at which they will resist the development of the tubercle-bacillus, the toxæmia and the lesions which it causes, and the secondary infections for which it prepares the way. Now, alimentation depends largely and in the first instance upon digestion. Arsenic and strychnine, therefore, are to be used to improve digestion,—locally by their effect upon the digestive tract, and constitutionally by their effect upon the blood and the nervous system. The best form of strychnine is strychnine arsenate, in which we combine small doses of arsenic acid with small doses of

strychnine. Strychnine arsenate may be given in doses of one-half milligramme (gr. $\frac{1}{144}$), or of one milligramme (gr. $\frac{1}{72}$).

If you give it in the smaller doses, give it frequently; that is to say, in the average case of chronic pulmonary tuberculosis give about six doses in the course of the day. If you give the larger doses, give about three doses in the course of the day. If it is possible and convenient, and does not concentrate the attention of the patient upon drug taking, I prefer the frequent administration of the smaller doses. Arsenic may also be given in the form of Donovan's solution or of Fowler's solution, in doses of one-half minim before meals, for local effect, or in doses of from two to five minims after meals, for constitutional effect. When given in solution it is more likely to cause arsenical poisoning, if long continued, and one must be on his guard against that. The drug may also be given in the form of sodium arsenate or as arsenic iodide, concerning which latter salt I shall have something to say in another connection.

In addition to the use of strychnine and arsenic, I usually advise the patient to drink one-half pint to one pint of hot water about half an hour before each meal or the principal meal. The purpose of this is to cleanse the digestive tract, which is usually in a state of catarrh from impaired nutrition, and gently to stimulate the mucous membrane. Whenever a decided gastro-intestinal disorder exists, it must be treated according to the special indications in each individual case. Lavage with alkaline solutions is highly useful in many cases. Turpentine is an important remedy, particularly in cases presenting decided intestinal catarrh. It may be given in the form of oil of turpentine, terebene, or terpin hydrate; from five to fifteen minims of one of the liquids in emulsion with acacia, or from three to five grains of the powder, being given, preferably before meals, for local effect, as well at the time of absorption as at the time of excretion.

Ammonium chloride is another remedy which can be used to alleviate gastro-intestinal symptoms. It is more useful than turpentine when gastric symptoms predominate. About fifteen grains before meals is the average dose. It can be given at the same time as the hot water.

Sodium phosphate is useful under similar conditions, especially if there is a tendency to duodenal or hepatic catarrh. It may be given in half-drachm to drachm doses, in hot water, half an hour before meals. It frequently has a laxative and sometimes a purgative effect. The dose must be regulated accordingly.

To prevent or check fermentation processes in the alimentary canal,

creosote in doses of one-half minim before meals, hydrogen dioxide water (three per cent.) in doses of two fluidrachms, well diluted, before meals, salol, beta-naphtol, benzonaphtol, and similar agents, may be used. When indigestion or other disorder is manifestly dependent on impairment of circulation, digitalis, sparteine sulphate, and remedies of that group are indicated. Strychnine may, however, so improve the circulation as to render any other drug unnecessary. In a few cases nitrites may be usefully given coincidently with cardiac tonics.

Among roborants, the hypophosphites occupy a prominent place. They may be given in capsule, compressed tablets, or syrup. Of the commercial preparations of syrup of hypophosphites, I prefer that made according to Churchill's formula by a well-known pharmacist of Paris. Unlike most of the widely-advertised preparations, it contains not seventy, but only two, ingredients; it is a syrup of hypophosphites of calcium and sodium, or, as commercially termed, lime and soda. Churchill adopted this combination empirically; but certain recent investigations into the chemistry of the blood in tuberculosis, and into the chemistry of food and nutrition in animals insusceptible to tuberculosis, point towards a physiological explanation for Churchill's experience. Syrup of hypophosphites may sometimes be combined with iron in cases in which there is diminution of red blood-cells or of hæmoglobin. While marked diminution of the proportion of red cells is not common in tuberculosis, there is often considerable reduction of the hæmoglobin percentage, and probably of the total volume of blood. In such cases the combination of iron with arsenic or with the hypophosphites is extremely useful.

A good formula for this iron combination, originally suggested by J. Solis-Cohen, is the following:

Tincture of chloride of iron, 2 fluidrachms;
Diluted phosphoric acid, 3 fluidrachms;
Churchill's syrup of hypophosphites, enough to make 8 fluidounces;

the dose being a dessertspoonful in water after meals.

And then comes cod-liver oil. You note that I place it last. Cod-liver oil is of much utility as a food and as a menstruum for the administration of certain remedies. I do not think that it has any other therapeutic value. It is a useful food; and when you cannot get patients to take enough food without it, and especially enough fatty food, it should always be prescribed. But when the patient is able and willing to take butter, meat-fat, salad oil, and cream in sufficient quantity, the necessity for cod-liver oil as a food usually disappears.

Sometimes, when a patient seems unable to take or digest fatty food, the administration of compound spirit of ether, one or two fluidrachms before or just after meals, or of some preparation of the pancreas or of bile, will answer a useful purpose. Cod-liver oil may be employed as a menstruum, especially for creosote; and that brings me to the other class of remedies, those which correct morbid cell-action and combat toxæmia. While I am not convinced that the bacillus tuberculosis, *per se*, does much harm to a patient, I do believe that the toxæmia resulting from the presence of tubercle-bacilli in the lungs, through the chemical processes set up by their activity and the activity of various other microbes for which they prepare the soil, causes very many distressing symptoms, and may finally kill the patient. The fever, the night-sweats, the loss of appetite, the emaciation, the restlessness, are probably directly and indirectly due to the absorption of various toxins. To combat that toxæmia we have two remedies of prime importance: *creosote* and *iodine*. Iodine may be given in various forms: of these I place first iodoform, and second ethyl iodide. Iodoform is not a germicide of high rank, but it has, when applied locally, a corrective influence over the histologic processes of tubercle formation, and probably acts in somewhat the same manner when taken internally. When a patient can take iodoform,—when his stomach is not against it, and when it does not cause distressing symptoms,—it is extremely useful, and should be pushed to the point of tolerance. It may be given in capsules, with correctives for stomach-trouble, if you like, or may be given in pill-form, with glucose. Sugar-coated and gelatin-coated pills are in the market, but, as a rule, are not to be depended on. Certain changes take place after a while that render them insoluble and irritating. Extemporaneous manufacture is best. With antituberculous and antitoxæmic medication, roborant medication may be combined. A combination that I have prescribed for some years consists of:

Reduced iron, 1 grain;
 Iodoform, 1 to 5 grains (increased according to tolerance of patient);
 Arsenic iodide, $\frac{1}{4}$ grain to $\frac{1}{2}$ grain;
 And enough (say 2½ grains) balsam of Peru to make up the mass, which is given in capsule.
 Dose, one capsule after food, thrice daily.

Most patients can take this without trouble; in other cases we have to give with it small doses of opium or of extract of hyoscyamus for the sake of the stomach. Some patients cannot take it even then. A patient taking iodoform, pushed to the point of tolerance, and observing

the hygienic measures of which I have spoken, will often surprisingly recover strength and weight. I have at present under my care a man some forty-five years of age, whom I first saw about four years ago with pulmonary hemorrhage. He has not fully recovered, some laryngeal lesions persisting, but he has remained for two years in fairly good condition, the lungs presenting to percussion and auscultation no evidence of active morbid process. He has been taking iodoform at intervals and for months at a time, and now weighs about one hundred and ninety pounds. This is about what he weighed when first taken sick, perhaps a few pounds heavier. In a patient seen at the Jefferson Hospital some seven or eight years ago there was a gain of eleven pounds in two or three weeks under the combined administration of iodoform and large quantities of milk. Iodine may likewise be given as arsenic iodide, as calcium iodide or strontium iodide, as compound tincture or compound solution of iodine, as syrup of hydriodic acid, and by inhalation as ethyl iodide. The latter has special indications. Drs. Shurly and Gibbes advocate hypodermatic injections of iodine dissolved in glycerin with the aid of potassium iodide, as part of a special routine which includes injections of gold-and-sodium chloride and inhalations of diluted chlorine gas. In general, iodine is to be employed in the early stages of chronic forms of pulmonary tuberculosis, especially in scrofulous subjects, and even in advanced cases when there is but slight tendency to softening or cavity formation; in other words, when proliferation exceeds necrosis. Some patients, however, are unable to take iodine in any form, and then we have to fall back upon creosote. This also has a special indication when there is much catarrhal inflammation of bronchi or alveoli, when there is rapid softening or decided cavity formation, and when there is a tendency to high or prolonged fever; in other words, when desquamation or necrosis is active, or sepsis is marked. Jaccoud believes that creosote favors fibrosis, on which, as we have previously seen, local healing depends. In my own view this action is indirect, being due rather to removal of hindrances to healing than to direct stimulation of reparative processes. Whatever the method, the result is good. The drug should be pushed nearly but not quite to the point of tolerance. I have already said that creosote may be usefully given in small doses, such as one-half minim three times a day, before meals, as a corrective to stomach-disorders; but when employed against the toxæmia of tuberculosis it should be given in comparatively large doses. The best way of giving it, on the whole, is in milk, if the patient can take it, running up to about five minims of creosote in a tumblerful of warm milk, four times

a day, taken between meals, so as to supply the patient with that much extra nutriment.

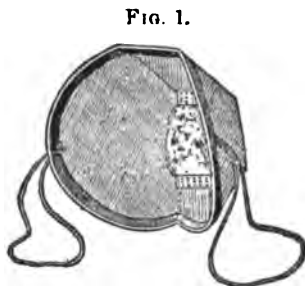
Success with the prescription of creosote will depend largely upon whether the patient really uses creosote or something else. Most of the stuff that is sold for creosote is principally something else. There are two brands of creosote in the market upon which one can depend. That which I have used for the longest time, and with which I am perfectly satisfied, is "Morson's Beechwood Creosote," which is made in England. More recently there has been brought into this market a beechwood creosote made in Germany and highly recommended by German authorities in whom I place confidence; but my own recommendation, from my own experience, is Morson's, and that is what I usually prescribe. If you simply write "creosote," and let the druggist give what he pleases, which will often be the cheapest article he can buy, you may get no result, or may irritate the patient's stomach to such a degree that he will refuse to take the drug ever afterward. When creosote cannot be given in milk it may be given in capsule. Capsules of creosote and cod-liver oil are made. A useful preparation is the combination with morrhuol put up in capsules by Chapoteaut, of Paris. Creosote may be given in cod-liver oil without capsules. Put half an ounce of cod-liver oil in an ounce phial, add the dose of creosote, and then let the patient shake it well and swallow the mixture. Some like it; they say it tastes like fat mackerel. Creosote may be given with alcohol and glycerin. I often add tincture of cardamom to such a mixture.

Dr. W. H. Flint, of New York, claims excellent results from the administration of creosote by the rectum. I think he suspends it in oil or milk. I have not tried the method, but I do not doubt its usefulness in any case in which the patient's stomach would not tolerate the creosote. I have given eucalyptol in that way,—usefully, I think,—suspending it in mucilage of acacia or dissolving it in olive oil. When I cannot get patients to take creosote, however, I resort, if the expense is not a hindrance, to a salt of guaiacol. The salicylate, the carbonate, and the benzoate are now in the market. They are almost tasteless, and any one of them may be administered in powder, pill, cachet, or capsule, in doses of three to five grains, three to five times a day. I prefer the salicylate, as the salicylic acid is useful. When the guaiacol salts are too expensive, I use phenyl salicylate in corresponding doses. There is now in the market a so-called carbonate of creosote which is highly recommended. Carbonic acid is a gastric sedative, and hence this combination may be useful.

When we wish to administer creosote or iodine so as to affect the respiratory tract especially, we resort to inhalation. First as to iodine. The most convenient form is ethyl iodide, or hydriodic ether, as it used to be called. Although it belongs to the ethers, it is twice as heavy as water, in which it will, therefore, sink. And this is one means of administering the drug: take a wide-mouthed four-ounce phial, put in a tablespoonful of water, and drop into that five drops of ethyl iodide, which will sink to the bottom. Then, as the drug is volatile, the warmth of the patient's hand as he grasps the phial will cause the vapor of the ether to rise through the water, diffusing through the air above it, and the patient can place the bottle to his mouth and inhale. This method may be used when you wish the patient to have a measured dose of the iodide. I rarely, however, give a measured dose; I let the patient take in his hand an ounce phial containing originally one-half ounce of ethyl iodide, and inhale by simply holding the unstoppered bottle to his mouth or nostril. It should be an amber-colored bottle, and, when not in use, kept cool and away from the light, to prevent decomposition of the contained drug. Let the patient inhale the medicament through the nose and mouth from one minute to five minutes, gauging the time by his susceptibility. Some persons become vertiginous in a short time, some in two or three minutes, and others not until after quite a long time. By this method there is systemic absorption of iodine, and the drug likewise exercises a useful influence upon local inflammations and ulcerations in the respiratory tract, especially in the larynx, both when inhaled and, later, when eliminated. Part of the usefulness of the terebinthines, of creosote, and of iodine preparations, when given by the mouth, skin, or rectum, is likewise due to local effect during elimination by the respiratory mucous membrane. Some physicians oppose inhalations in pulmonary tuberculosis because the method does not bring the drugs in contact with the bacilli in the lungs; but these drugs are not employed with any such purpose. They certainly do not act by killing tubercle-bacilli, either in elimination or in absorption, but they nevertheless do good. Don't get the idea that the purpose of inhalations or of antitoxæmic medication is bactericide, for it is not. Action upon the cells and fluids of the body is what is aimed at; and while we cannot at present explain that action, its effects can be clinically recognized. A convenient method of inhalation is by means of the little perforated zinc respirator devised by Dr. Burney Yeo, of London (Fig. 1), or a similar appliance made of perforated celluloid.

In addition to ethyl iodide, I have found creosote, terebene, eu-

calyptol, thymol, menthol, and chloroform useful, by inhalation, in relieving cough, promoting the healing of laryngeal and bronchial catarrh, and disinfecting the contents of bronchiectases and accessible vomicae. For use on the sponge of the Yeo respirator, a mixture of equal parts of creosote, terebene, ethyl iodide, and spirit of chloroform is a favorite prescription. Twenty drops is about the quantity used at one time, and it is renewed about twice daily. In cases of laryngeal ulceration, menthol (twenty per cent.) in olive oil has been useful topically, though there are other and sometimes better applications. These drugs in oily solution may likewise be injected into the trachea and allowed to run into the bronchi and lungs, for local effect. I show you here a curved hard-rubber syringe, the nozzle being perforated so as to send the finely-divided stream in several directions. Inserting this by a rapid motion between the vocal bands, a drachm of sterilized olive oil, containing five minims of creosote or three minims of guaiacol, is gently injected into the trachea. In some cases the solution may be made stronger. You see how little distress it causes, and especially in bronchiectatic cases it seems to be extremely useful.



Such is a general outline of the medication useful in chronic pulmonary tuberculosis. I have said nothing of intrapulmonary injections, as that subject is deserving of a special lecture.

In acute cases, and in the more acute stages of chronic cases, rest in bed, the application of an ice-bag over the præcordium to reduce temperature and quiet the heart, the inhalation of nitrous oxide,—say two gallons at a time (eight gallons in all), before twelve o'clock noon, daily, to check cough, reduce febrile and nervous excitement, and promote sleep at night,—and the administration of opium, of codeine, of morphine, of digitalis, of phenyl salicylate, of quinine hydrobromate, are among the measures most useful in varying conditions. To check hemorrhage, rest, ice over the heart, ice in the mouth, turpentine, and calcium chloride internally; to check night-sweats, atropine, picrotoxin, camphoric acid internally, sponging with alcohol and quinine; to check cough and vomiting, codeine, hyoscyne hydrobromate, strontium bromide, and dilute hydrocyanic acid; to relieve dyspnoea, quebracho and strychnine,—are among the most approved remedies. Do not give several drugs at once, but try to select one, such as codeine or turpentine, for example, which meets several indications. Do not neglect a

patient because he cannot recover. Even when all hope of promoting recovery or prolonging life is gone, palliation, the promotion of comfort, the lessening of pain and distress, are objects well worthy of your highest skill. All this, however, is but the extended application of principles familiar to you.

As to treatment that aims at the promotion of recovery, I beg that you will remember, as the sum and substance of my teaching, that there is no "specific" in the treatment of tuberculosis; that each case must be an individual study; that, above all, drug giving is secondary to food, water, light, and air, our aim being not microbicide, but nutrition.

AMŒBIC DYSENTERY.

CLINICAL LECTURE DELIVERED AT THE BUFFALO GENERAL HOSPITAL.

BY CHARLES G. STOCKTON, M.D.,

Professor of Medicine at the University of Buffalo; Attending Physician, Buffalo General Hospital.

GENTLEMEN,—This patient is a German teamster, forty-eight years old, whose family and personal history are without interest in relation to his present illness. About six weeks ago he began to fail in health, but his symptoms were vague. Three weeks thereafter he was seized with acute abdominal pain and diarrhœa. There is some doubt as to whether or not he vomited, as his statements are conflicting.

He entered the hospital ten days since, very weak and emaciated, having a brown, dry tongue, loss of appetite, and from ten to twenty-five evacuations daily. There was slight abdominal tenderness, but no distention. His temperature was 99° F., and his pulse 80, weak and small. He was given calomel on entrance, and thereafter received large hot lavements and laudanum and starch-water injections without benefit. From the defecation-book I learn that his evacuations have occurred as follows:

First night	8	First day	10
Second night	7	Second day	0
Third night	5	Third day	20
Fourth night	5	Fourth day	17
Fifth night	5	Fifth day	8
Sixth night	4	Sixth day	15

For sixteen hours he has had no passage. As now seen, the patient is emaciated and extremely debilitated, requiring constant and full stimulation. There is but slight elevation of temperature. The pulse is weak, and at times almost imperceptible. It has risen in frequency from sixty to one hundred and ten beats per minute. His weakness is also shown by the shrunken appearance of his face, and by the relaxation of the body. His decubitus is that of prostration; he lies low in bed, with little power to move, so that he remains about as we put him. His tongue is protruded slowly. It is rather narrow, dry, and

heavily coated. Generally it is drier and browner than at present, its improved appearance being due to local applications. You will notice, also, that the patient is hiccoughing, and this is simply an expression of his enfeeblement. This hiccough has been present at intervals for thirty-six hours, and is, as you are aware, a most unfavorable prognostic symptom. The abdomen is natural in appearance; it is neither tympanitic nor flat. He complains of quite general tenderness on pressure over the abdomen. Careful examination, however, reveals the fact that there is greater tenderness over the region of the colon throughout its entire length than elsewhere.

So much for the general description of the case. The evacuations from the bowels contained at first mucus and blood. They have always been very fluid, very offensive in odor, and at times have contained a yellowish sediment. In this bottle you will see an evacuation of this morning, and, except that medication has rendered it darker than usual, it exemplifies the character of the diarrhoea. Above the sediment you will notice a comparatively clear serous discharge without mucus or blood. There is no evidence in it of a hurrying down of food, undigested, and therefore we cannot consider the case one of serous diarrhoea due to trouble with the small intestine. If the character of the discharge was similar to this except for the presence of mucus and blood, and with the symptoms of pain, fever, and tenesmus, then we should pronounce the disease an acute colitis or dysentery. The local tenderness over the colon in this case suggests a colitis, but not of the ordinary kind, both because the character of the discharge does not correspond, and because of the low temperature; the absence of excessive tenderness and of tenesmus is inconsistent with the idea of an acute colitis. The facts that this case did not seem like one of ordinary colitis or diarrhoea, that the man was gravely ill, and that the trouble began later in the season than do most diarrhoeas, led me to have his stools examined, with the idea that we might find in them the cause of tropical dysentery. This disease, which is not common in this section of the country, depends upon a micro-organism, a representative of a low form of animal life,—an *amœba*. The disease has, therefore, been termed “*amœbic dysentery*,” and the micro-organism the “*amœba coli*,” or, by Councilman, the “*amœba dysenteriae*.” These *amœbæ*, as I expected, were found in great numbers in the stools of this patient by Dr. Bergtold, and, later, by several of us.

This *amœba* has a diameter two or three times that of a white blood-corpuscle,—that is, twenty or thirty micro-millimetres. It has a nucleus, and around the nucleus a granular mass, and two or three or

more vacuoles which are characteristic of amœbæ. Around this is a perfectly clear zone with a very distinct, dark boundary. Like all amœbæ, it has the power of making the so-called amœbic movements by putting out projections of its mass called "pseudopods" and then drawing itself forward by means of them. The pseudopods of this amœba are large masses, not slender filaments, as in the case of other amœbæ. It assumes, therefore, not always a circular outline, but sometimes one suggestive of a human foot, sometimes one almost rectangular, and again, various irregularities. According to my observations, the amœboid movements are made quite quickly, and then there is a pause. These movements are only to be noticed when the fresh discharge is examined. After a short time the amœbæ die, and it is difficult to determine their nature. These bodies are very easily discovered by a microscope of fair power, and are easily recognized after having once been seen. I had the privilege of seeing these organisms with Councilman, in a case that he subsequently reported, two or three years ago. The post-mortem appearances in such a case are striking. The changes in the tissues brought about by the amœbæ are quite unlike those of ordinary dysenteric inflammations. The ordinary dysenteric stool contains pus, mucus, and broken-down tissue; but especially pus. On the contrary, pus-corpuscles are rarely found in the discharges of amœbic dysentery, although you will find broken-down tissue and fatty degeneration showing itself in the epithelium. On examining the bowel, you will find ulceration occurring in any part of the colon, and sometimes in the ileum, but especially in the transverse colon. The ulcers are in the beginning round or ovoid, but later they become irregular, from a softening and liquefaction of the intercellular substance which holds together the connective tissue. The parenchymatous cells, also, are dissolved, but later than the connective tissue, so that there is left an overhanging wall, a bank-like projection, on the margins of an excavated ulcer. Sometimes the ulcers meet beneath the submucosa, or beneath the transverse layer of the muscular coat. Occasionally the ulceration goes even deeper, and passes entirely through the longitudinal muscular coat. It rarely causes a complete perforation of the bowel, when, of course, peritonitis is set up, and, unless altered in its character by the presence of other micro-organisms of the pus-forming kind, it will be as distinct and peculiar as the disturbance in the bowel itself.

It has been noted that certain epidemics of dysentery have been followed by many instances of abscess of the liver. Careful study of amœbic dysentery shows that hepatic abscess takes place in a far larger proportion of cases of amœbic dysentery than in other kinds. In some

groups of cases the proportion complicated with hepatic abscess has been fifty per cent., in other groups forty per cent., thirty per cent., or twenty-five per cent. When you examine the hepatic abscess as I have had the opportunity of doing, you will find that that also has the same peculiar character as the ulcerative process in the bowel. It is not an ordinary degeneration of suppuration, but there is a mass of broken-down liver-tissue apparently liquefied and containing changed hepatic cells. The abscess has irregular walls, and upon them new cells have apparently rushed in to protect against the advance of the degenerative process. In abscesses which have healed, a hard, dense, limiting structure lines the cavity. In these respects the pathological changes of amœbic dysentery are peculiar to it alone.

The amœba coli was discovered in 1859, by Lambl, a German observer. Later, it was studied by Lösch, who correctly attributed the peculiar dysentery which he found, clinically, to this organism. Later still, Cartulis, of Egypt, found that this amœba was a very common accompaniment of dysentery in that country, and particularly in the dysentery of European residents. The native Egyptians are nearly exempt. The disease is more common in Algiers than in Egypt; but, on the whole, it is much more common in warm climates than in cold ones. In this country it was studied first by Osler, who discovered it in a sailor who came from Galveston or Panama. Since then it has been observed in several cities of this country, and I believe also in Montreal. The amœba coli was first found in this city by Dr. Herbert Upham Williams, in a case which I had last summer. This is the second case in which the amœba has been demonstrated in Buffalo.

You will find a good description of the disease in the Transactions of the Association of American Physicians for 1892.

You may ask me why I was led to consider this case as other than a common dysentery. In ordinary dysentery the symptoms are quite different. The patient is suddenly seized, vomiting is more frequent and persistent, the temperature is higher, the inflammation is more nearly like ordinary inflammation due to pyogenic bacteria, and, consequently, the dejecta contain not so much serum as muco-pus and blood. The disease, too, runs a shorter course, usually not more than a week or ten days. Amœbic dysentery does not resemble closely the severe form of epidemic dysentery with the formation of a croupous exudate, for, while both are accompanied by severe depression, the former has not the immense amount of shreddy croupous exudate coming away in the fecal discharges, and the microscopic examination for the amœba coli makes a definite diagnosis possible.

Amoebic dysentery is a somewhat prolonged disease, lasting from six to twelve weeks, and it is a dangerous affection. While some reports show that about twenty-five per cent. of the cases are fatal, the cases studied in this country, particularly in Baltimore, have resulted in a mortality of nearly ninety-five per cent.

The treatment is, of course, directed towards supporting the patient, for, whether the amoeba is alive in the intestines or not, the poisons produced by this organism cause marked depression, calling for stimulation and careful diet. Local measures are undertaken with the hope of destroying the parasite, and quinine in solution has been found of apparent benefit. Even a 1 to 5000 solution has proved sufficiently strong, and Osler has used enemata varying from this strength to 1 to 1000. Although these enemata destroy the organisms wherever they can be reached, it is manifest that they cannot reach the amoebæ lying in the overhanging wall of the ulcer, or in the lymphatics, or in the hepatic abscesses. As these abscesses are most frequently in the right lobe of the liver, it is not unusual for the inflammation to extend through the diaphragm to the right pleura, and thence to the lung, where abscesses may be formed. The expectoration in these cases has been found to contain living amoebæ, and the immediate cause of death in this form of dysentery has sometimes been the pulmonary abscesses. Besides washing out the bowel for the sake of cleanliness, injections of starch-water and laudanum have been beneficial in lessening the number of evacuations.

In the present case the outlook is a very serious one. With hic-cough and great prostration in spite of the fact that everything has been done to support his vitality, with the poisoning going on continually, and with the probability that abscesses have formed in other parts of the body, the lethal result is daily expected.

I am very glad to show you this case, for the disease, though more wide-spread than was believed a few years ago, is, in this section, still rare. But it is necessary for you to be able to recognize even the infrequent diseases, for your practice will not be limited to common affections. I am certain that I have seen a number of cases of amoebic dysentery, especially when physician to the penitentiary, where there were many prisoners from the South, and these cases passed unrecognized simply because I was unacquainted with the disease.

[*Note.*—This patient died three days after the delivery of the lecture. The changes in the colon and liver, as revealed by the autopsy, corresponded with the description above given.]

ENDOCARDITIS AND PERICARDITIS; EXOPHTHALMIC GOITRE; EMPYEMA; NERVOUS JAUNDICE.

CLINICAL LECTURE DELIVERED AT THE CHICAGO POLICLINIC.

BY JOSEPH M. PATTON, M.D.,

Professor of Clinical Medicine in the Chicago Policlinic, etc.

ENDOCARDITIS AND PERICARDITIS.

GENTLEMEN,—This young lady is seventeen years of age. She had always been healthy, until about six weeks ago, when she was taken with manifestations of acute rheumatism, located in the joints, which, her physician tells me, pursued no unusual course. About a week after the commencement of the rheumatic attack I was called to see her in consultation because of the symptoms, which were attributed to her heart. Three or four days before I was called to see her she had developed a systolic murmur in the region of the aortic valve. The murmur had the usual characteristics of aortic stenosis. The heart was rapid and excitable, but there were no unusual manifestations until the time I saw her, a few days later. At that time, the physician in charge noticed that the previously strong, energetic beat of the heart had become less perceptible, and the motion more heaving and undulating in character. The heart seemed to work harder, and there was more dyspnoea. At the time that I saw her, the temperature was about 100.5°, the pulse was rapid and irregular, and there was considerable dyspnoea, but no cough.

Examination of the heart showed that the area of motion was increased, the apex-beat could not be distinctly located, the motion was rather heaving and undulating in character, and extended all over the cardiac area. The heart was evidently working hard and energetically, and yet the previous well-defined apex-beat was lacking. Percussion showed that the dulness extended from the second intercostal space to the sixth, and from one-quarter of an inch to the right of the sternum along the right parasternal line to about the left nipple-line. The dulness was wider below than above. Auscultation showed a blowing,

systolic murmur in the aortic area, which was transmitted into the vessels of the neck, and which was evidently an aortic stenosis caused by rheumatic inflammation about the aortic valve. The murmur was not nearly so distinct as it had been a few days previous. The first sound of the heart was muffled and indistinct, although the heart was laboring with considerable force. At the base of the heart there could be heard at times a harsh, rubbing double sound, which was evidently a pericardial friction-sound. A diagnosis was made of endo- and pericarditis, of a rheumatic nature. She was kept on anti-rheumatic treatment; a blister had been applied to the pericardial region, and it was allowed to remain until it had acted sufficiently. In the course of a week the area of dulness had decreased markedly. The heart was not laboring so strenuously, the friction-sound at the base was more apparent, and she was improving in every respect, and went on to recovery. I show her to you to-day because you may still hear the dry, rubbing friction-sound at the base of the heart, but not so clearly as it could be heard a week ago.

These cases of combined inflammation of the endocardium and pericardium in the same subject are somewhat rare. They are usually associated with rheumatism.

The diagnosis is usually not very difficult, especially when you get the signs of effusion as clearly as they were obtained in this case; but where the two conditions are associated, it may be difficult to distinguish between an endocardial and a pericardial murmur. Endocardial murmurs are softer, and are either systolic or diastolic. Pericardial murmurs are harsher, more apt to be rubbing, and are usually double. They are not transmitted, and they are apt to disappear sooner than endocardial murmurs. Small amounts of fluid in the pericardial sac may be difficult to recognize; large amounts, sufficient to distend the sac, will increase the area of dulness in a direction unlike that given by enlargement of the heart itself. The dulness may extend as high as the first rib and as low as the sixth, and from an inch to the right of the sternum to the left of the nipple, but usually the limits are much more circumscribed than this. The dulness is more or less pyramidal in shape, being wider at the bottom. There may be some change in the lines of dulness when the patient changes position. Dulness in the fifth intercostal space to the right of the sternum is stated by Rotch to be diagnostic of even very small effusions, and to be a valuable diagnostic sign. Roberts also states that this sign is of value where aspiration of the pericardium may be demanded.

Effusion into the pericardial sac may be confounded with pleural

effusion, but the dulness of pleural effusion will extend lower, and farther around to the side and back. The respiratory sounds in the infra-scapular region in the back are very seldom interfered with, except in very large pericardial effusion; whereas in pleurisy they will be modified by small effusion. The valuable point in diagnosing between these two conditions would be the displacement of the apex-beat, which nearly always occurs with pleural effusions, even if they be small in quantity and circumscribed.

The diagnosis between these two conditions, of course, would be between effusion in the left pleura and effusion in the pericardium; and therefore this displacement of the apex-beat in pleural effusions is a decidedly valuable sign.

The question of aspiration of the pericardium will occasionally present itself in these cases, and in deciding the necessity of such a procedure you must bear in mind that rheumatic effusions into the pericardial sac tend to get well of themselves, and usually the fluid disappears about as rapidly as it came; therefore they are to be treated conservatively, and not interfered with unless the danger to the heart is imminent. If the pressure of the fluid on the heart so interferes with the action of that organ as to produce great dyspnoea and failing circulation, the sac should be aspirated. This is best done by an ordinary aspirator, or by a small one, where the current can be reversed. The needle should be entered from half an inch to an inch to the left of the sternum, in the fifth intercostal space, in a direction backward and upward. As soon as the needle enters the tissues, the vacuum should be turned on, and the needle then advanced in search of the effusion. Sometimes the fluid can be reached by inserting a needle at the apex of the notch between the xiphoid appendix and the cartilages on the left side. It is possible that some cases may be aspirated immediately to the right of the sternum, but this must be the exception.

An interesting prognostic question in regard to these cases is the liability to permanent adhesion between the two surfaces of the pericardium. This is a condition which we are practically unable to diagnose. There are no positive signs of its occurrence. Some writers have designated signs for the recognition of its occurrence, but they are more or less unreliable. Hope has stated that an irregular, jogging, trembling motion, very abrupt in its character, is distinctive of adhesions between the two surfaces of the pericardium. Aran has claimed that in this condition there is a loss of the second sound. We often see cases where both of these conditions are present and yet adhesion has not taken place. Perhaps the most reliable sign is that

given by Skoda, where there is systolic retraction of the intercostal spaces, and perhaps, also, some depression of the lower end of the sternum. There is apt to be arrhythmia associated with adhesion of the pericardial surfaces, but it is not in any way distinctive, and I have seen cases where this condition has obtained, yet in which none of these signs were present during the life of the patient. Where the pericardium has become adherent to the sternum this adherent condition has been termed *indurated mediastinal pericarditis*. Bands from these lesions may compress the aorta, and resulting from these conditions Kussmaul has described the *pulsus paradoxus*,—a pulse which disappears with full inspiration. Traube has noticed this sign in cases where the mediastinum was not involved.

This young lady, while the pericardial friction-sound can yet be heard, is rapidly improving: the sound is growing weaker. The endocardial murmur still remains, and in all probability the aortic valve has been permanently affected. How much the blister had to do with the improvement in her case it is difficult to say. Blisters are objected to by some writers for this disease, and very often we see them entirely fail. We will continue her for some time on anti-rheumatic remedies, such as sodium salicylate and potassium iodide, with iron, arsenic, and strychnine as general tonics.

EXOPHTHALMIC GOITRE.

This young lady is twenty-one years of age. She has never suffered from any special illness previous to the present one, although her menstruation developed early and was never very regular. She has been suffering from some dysmenorrhœa, with, at times, a little menorrhagia, but not enough to demand any treatment for either of these conditions. She says that about four months ago she began to notice some palpitation of the heart. This troubled her at intervals,—more when under excitement or mental strain than on exertion. About a month after this she began to notice some prominence of the eyes, and about the same time her attention was called to some enlargement of her throat. While these two symptoms developed about the same time, she thinks that the prominence of the eyes was present before the enlargement of the throat. The latter symptom, she tells us, was first noticed after some unusual mental excitement, and developed within the space of two or three days to the size which we see presented now. The thyroid, you notice, is quite large,—somewhat larger on the left than on the right side. It is not very firm. There is no murmur present in the gland. Examination of her heart shows it to be

slightly dilated. There are no murmurs present in the heart. The action is rapid, the pulse being now 130. There is at times considerable arrhythmia, which varies greatly under different mental conditions. Her eyes, you see, are quite prominent, the right being a little more so than the left. She thinks that they are more prominent about the time of her menstruation, and both the eyes and the neck sometimes are apparently worse after mental excitement. Stellwag's sign, of widely-open lids, showing more of the sclerotic than usual, is slightly shown in the right eye. Von Graefe's sign, the incoördination of the after-following lid when the patient looks down, does not show in this case. Examination of her eyes in the ophthalmological department shows that Becker's sign, pulsation of the retinal vessels, is present to a slight degree. Moebius's sign—that is, insufficiency of convergence—is present in this case. Spasm of the elevator of the upper eyelid is said to be pathognomonic; it is not marked here. This is a typical case of exophthalmic goitre, in which the three cardinal symptoms are all present and have developed in a comparatively regular manner. As a rule, the cardiac symptoms—that is, the rapid and arrhythmic action of the heart—develop early in these cases. They may, however, succeed the enlargement of the thyroid and the exophthalmos. There may be only one of these classical symptoms present, or they may all three be present. The value of the various signs mentioned as diagnostic aids is somewhat difficult to estimate. In the cases that I have seen, Moebius's, Becker's, and Stellwag's signs have been present in the order mentioned. Von Graefe's sign has seemed to be the least reliable of any of them. Of the cases that I have noted in which Von Graefe's sign was present, a large proportion were males. My experience with this disease has practically been limited to females, and whether Von Graefe's sign is most often present in males I do not know.

The various manifestations of the disease which may present themselves will occur alike on both sides, which will aid in distinguishing the symptoms of this disease from like symptoms produced by pressure on one sympathetic by thyroid tumors. In the latter event the pupils must be irregular. In my experience I have not found a glandular murmur with sufficient regularity to give it the diagnostic importance ascribed to it by Guttman, Da Costa, and others.

This condition is associated with all kinds of manifestations regarding the general and nervous systems. Tremors of the extremities are often present; the so-called Charcot's knee-symptom may at times be found where there is giving way of the knees; but these symptoms

vary so widely in their characteristics that they are not of much account. The heart is usually quite rapid, with a pulse-rate of from 100 to 200. It is usually more or less irregular, and the arrhythmia does not seem to depend much on the lesions of the heart itself. Those cases which show the least change in the condition of the heart muscle or cavities are likely to show as much arrhythmia as those where there is considerable change in the heart itself, if not indeed more. The continued rapidity of the heart's action does not seem to affect the integrity of the heart as much as one would expect.

The etiology of the condition is largely undetermined. Lesions of the central nervous system have been found in some cases and have been absent in others, so that there is no definite pathology of the disease known. Enlargement of the thymus gland has been found present in some instances, but just what relation this may have to the disease has not been ascertained.

The treatment of this condition is somewhat unsettled, but the general indications are to increase the tone and strength of the nervous system, to increase the control of the vaso-motor system over the vessels, and to tone up the heart and stimulate it, if necessary. The necessity of having all three of the classical symptoms of the disease present in order to recognize it is not acknowledged now. It is believed by many that there are very many modified cases of this disease in which the manifestations may belong largely to the nervous system, or perhaps to the heart, or to both, and in which there may not be enlargement of the thyroid or exophthalmos, and yet in which the diagnosis would be the same as in this case. In the incipient stage of the trouble, especially where it begins with rapid and irregular heart, the indication is to relieve the tachycardia as much as possible. This can largely be accomplished by rest, instead of by depressing remedies. These cases should be put to bed, in order that their circulation may be as quiet as possible. Exercise should be given them by massage, and this can be done without exciting the heart in the least; in fact, the heart may become from ten to fifteen beats slower during a carefully-performed massage treatment, and the bodily strength and health are thus kept up without taxing the circulation. Medicinally, they should get general tonics,—quinine, strychnine, iodides, perhaps, in some cases, and belladonna. Belladonna has been recommended and is largely used in these cases, and seems to benefit them. A favorite combination of mine for these cases is a pill containing a grain or two of iron, one-half grain of quinine, one-sixth of a grain of extract of *nux vomica*, and one-quarter of a grain of extract of belladonna, three

times a day. This girl has improved under this form of medication. The exophthalmos is not so marked, the enlargement of the thyroid is not so great, and the arrhythmic condition of the heart has much improved. We will continue her on this same line of treatment.

In regard to the administration of heart stimulants in these cases, I believe that we should be guided by the condition of the heart muscle and cavities, and should not give this class of remedies indiscriminately in cases of exophthalmic goitre, simply because the heart is rapid or arrhythmic. The arrhythmia, in many instances, is purely from nervous influences, and cardiac stimulants will do more harm than good when such is the case.

EMPYEMA.

This boy is fourteen years of age. Some two months ago he had a severe attack of what his physician said was la grippe, with bronchial manifestations. These went through a moderately severe course, and he was apparently convalescent, when he became worse, the temperature went up, and he suffered from dyspnoea. I was called to see him at this time, and discovered signs of effusion in the right pleural cavity. The temperature at that time varied from 100.5° to 102.5° in the evening. There were no sweats. Aspiration was resorted to for the relief of the effusion, and about two quarts of pus were withdrawn through an ordinary aspirator. Following this, for two or three days the temperature was lower, when it again got back to the old figure, and the pleura was again filled. It was evident that this was a secondary invasion of the pleura, and that little could be done with simple aspiration: an operation was therefore advised. In view of the recent onset of the affection, the character of the pus, which was not very thick, and the rapidity with which the cavity refilled, it was deemed possible to drain this cavity without resorting to resection of the ribs. While in many instances the latter operation is probably the best, it is an open question if it is not done in many cases where it is not absolutely necessary. Therefore, with a view of saving the lung expansion as much as possible, and to avoid compromising the action of the lung by retraction of the chest wall, we inserted a tube into the pleura, after the method recommended by Bülow, of Hamburg. This was done in the following manner. A wide, flat trocar, of sufficient size to admit of the passage of some three-sixteenths-inch tubing, was introduced in the anterior axillary line, in the seventh intercostal space, first incising the skin and pushing the trocar and canula in with a rapid motion, in order to prevent any plastic deposit from pushing in front of the trocar

and blocking up the passage of the fluid. The trocar was then withdrawn, leaving the canula in place, and through this was introduced some three-sixteenths-inch syringe tubing, which had previously been sterilized. About six or eight inches of this was introduced into the pleural cavity. It was connected by a glass coupling, about four inches from the chest wall, with a coil of tubing some two or three yards long, which emptied into a vessel of water by the side of the bed. In this way continuous siphonage was obtained, and the pus was drawn off as fast as formed. An ordinary cleat was put on the tubing, about three feet from the chest wall, and as fast as the tube filled up it was stripped out and the cleat replaced. The temperature ranged from 99° in the morning to 100.5° in the evening, and continued at about that figure. The tube was gradually withdrawn an inch or two at a time at intervals until but an inch or two remained inside of the pleural cavity. The lung had meantime expanded well, and about three weeks after the operation the tube was withdrawn and replaced by a soft, pure-rubber tube, about four or five inches long, which was left open and drained into some dressings at the side. The discharge had diminished to about one-half teaspoonful in twenty-four hours, and when this amount was reached the tube was withdrawn and the opening allowed to close up. Recovery went on in an uninterrupted manner, and I show him to you to-day that you may see the condition of the lung. You notice there is a slight difference of expansion between the two sides. At the level of the eighth rib the expansion is one-half inch less on the right side than on the left. At the level of the middle of the scapula there is no difference. The boy feels perfectly well, has a good appetite, and is strong. He has no cough, is not short of breath, and is daily using a breathing-tube in order to increase the action of his lung, and probably will soon diminish the difference in expansion to less than it is now.

This operation, I think, is advisable for a certain class of cases, of which this is a type. It has given good results, although it is objected to by some because of the difficulty of keeping up the drainage. In cases where much plastic material had been deposited, or where the fluid was flaky, the tube might easily become blocked. By using ordinary syringe tubing, which is stiffer than pure rubber, and does not bend as easily, and therefore is not so likely to become blocked, this difficulty is partly avoided. One objection to the syringe tubing is that it becomes very hard; but with a tractable patient this will not cause much difficulty.

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NERVOUS JAUNDICE.

The next patient I show you is a young woman, twenty-two years of age. She has not been in very good health for the past six or eight months, although she has not been under the care of a physician. The only trouble she complains of is a poor appetite, a tendency to constipation, and loss of strength. She says the day before yesterday she experienced great and unusual mental excitement. Following this she was nervous, restless, slept badly all night, and upon getting up in the morning noticed that her eyes and skin were decidedly yellow. This condition increased somewhat during the day, and by evening the skin was as yellow as you see it now. As you see, the skin is quite yellow, and the conjunctiva is decidedly so; otherwise she has no complaint to make.

This is one of the unusual cases of jaundice arising rapidly from nervous influences. These cases are not very common, but occasionally we see one. Just how or in what way they occur we do not know. We do not understand the nervous conditions which produce jaundice in this way. Jaundice is merely a symptom of some other condition, and yet it is so prominent a symptom that we discuss it largely in the light of a disease. Jaundice may result from anything which affects the liver-tissue itself,—from anything which affects the perviousness of the bile-ducts, either within the ducts, such as calculi, inspissated bile, or mucus, or an inflammation of the lining membrane of the duct, or from anything outside of the duct which will exert pressure, such as tumors, morbid growths, etc. Changes may result in connection with systemic conditions in general diseases, such as some of the fevers, pyæmia, etc., giving rise to jaundice, or it may result from poisons introduced into the system, which affect the blood. This particular form of jaundice does not come under any of these heads. There is no way that we can distinguish the nature of jaundice except by considering it in its relation to the other symptoms involved. We can by examination of the urine, perhaps, get some idea as to its nature. For instance, if the urine be dried on a slide, with a little salt, and a little glacial acetic acid run under the cover-glass, and heated to boiling, we may obtain the so-called Teichmann's hæmin crystals, which would indicate hæmatogenous jaundice; but this is not an absolutely reliable test. We have to consider the condition in relation to the other symptoms present, as, for instance, those symptoms which point to the various diseases of the liver, or those which point to obstruction of the gall-ducts, or its relation to fevers or other

general conditions, or to poisonous substances. The particular form of jaundice which we have in this case usually disappears of itself in a few days. The only treatment necessary is to keep the bowels open, attend to the diet, allowing only those things which are easily digested, and quiet the nervous system. The jaundice will disappear in a few days, and the young lady will be as well as ever.

ELECTRO-DIAGNOSIS: WITH ILLUSTRATIVE CASES.

CLINICAL LECTURE DELIVERED TO A PRIVATE CLASS OF STUDENTS.

BY A. D. ROCKWELL, A.M., M.D.,

Formerly Professor of Electro-Therapeutics in the New York Post-Graduate Medical School, and Electro-Therapist to the New York State Woman's Hospital.

THE value of electricity as a means of diagnosis can hardly be overestimated. Neither acoustics nor optics, mechanics nor chemistry, can throw more light upon obscure pathological changes. In many cases it points unerringly to certain histological states as well as to the exact location of lesions, and through it we obtain information which it would be quite impossible to elicit by any form of analysis, or examination, or instrument of precision. The methods of electro-diagnosis have, therefore, by no means been utilized to the extent that their great importance demands. This is due, without doubt, to the difficulties in the way of eliciting the desired information and in applying the knowledge thus obtained.

It is a very easy matter to get a theoretical knowledge of electrical reactions and their relation to health and disease, but it is not so easy to determine the exact relationship that exists between the normal anatomical condition of nerve and muscle, and deviations from the normal state. These difficulties are, however, by no means insurmountable, and by the exercise of knowledge, care, and patience one may become perfectly familiar with the delicate manipulations necessary for the expert in the art of electro-diagnosis. The ophthalmoscope, the stethoscope, and the appliances for urinary analysis are quite useless in the hands of the inexperienced. This is so well understood that few possess these instruments without having in greater or less measure acquired a capacity for using them. With electricity it is quite different. It is the exception to find one in the possession of electrical apparatus who is able to utilize it efficiently for diagnostic purposes. This was well illustrated in a recent case that I was called upon to see with a

very eminent practitioner of medicine in his special line of work. He wished me to see with him a patient whose condition he had diagnosed as locomotor ataxia, and whom he had been treating for some time. He had used electricity, or rather had the nurse use it for the most part, but, as the patient was gradually getting worse, he desired counsel. It was not very difficult to see by the most cursory examination that the patient was *not* suffering from locomotor ataxia, and an electrical interrogation of the muscles at once revealed the true character of the complaint. There was no reaction to the faradic current, and there was greatly decreased reaction to the galvanic, associated with the reactions of degeneration. The case was one of poliomyelitis anterior, and the attending physician had the mortifying reflection that he had not only mistaken one disease for another with which it ought not to be confounded, but had persistently pursued methods of treatment for which there were no indications.

Thus is closed to those who possess no knowledge of the principles of electro-diagnosis a wide field of investigation and the attainment of accurate knowledge relating to the diagnosis and prognosis of diseases of the brain and spinal cord, injuries and diseases throughout the peripheral nervous system, and injuries to the muscular tissue itself. Before offering a few illustrative cases, allow me to suggest the following general principles, which must be thoroughly understood before one can intelligently avail himself of the aid of electricity in the diagnosis of the various forms of paralysis.

When the paralysis is due to a lesion either of the brain or of the white columns of the spinal cord, the electrical reactions are, as a rule, normal. It is, therefore, no difficult matter to distinguish between paralysis due to brain lesions and disease of the white columns of the cord and paralysis of a purely peripheral origin, where the reactions are invariably abnormal. In paralysis of a single limb, when the reactions are normal, electricity will fail to indicate the seat of the lesion, but fortunately this question of differential diagnosis does not often arise, as loss of power of a single limb from columnar disease of the cord is exceedingly rare. Unlike the brain and white columns of the cord, any injury to the gray matter of the cord or pressure along the course of a peripheral nerve, sufficient to cause loss of voluntary movement, is associated with abnormal electrical reactions.

It is not difficult, as a rule, to distinguish between disease of the peripheral nerves and disease of the central gray matter of the cord, but when only a single limb is affected it is not always so easy to decide between the two, and therefore it is very important to take note of the dis-

tribution of the paralysis. It will be found that when the lesion is in the gray matter of the cord, either the limb is affected equally throughout, or the muscles are paralyzed in physiological or irregular groups. In peripheral paralysis, on the contrary, the loss of power takes place mainly, if not altogether, in anatomical groups. The value of electricity, again, as a diagnostic agent is seen in enabling us to discriminate readily between three very important diseases of the gray matter of the cord,—namely, myelitis, progressive muscular atrophy, and poliomyelitis anterior. In myelitis, when the entire length and thickness of the cord are involved, the abnormal electrical reactions are uniformly elicited in every muscle paralyzed, or there may be complete loss of electro-muscular contractility,—certain evidence of a gross lesion of the cord.

If only a limited section of the whole transverse area is degenerated, the reactions of degeneration are elicited only in the parts to which are distributed the nerves derived from the diseased segment, while above and below the reactions remain normal.

In progressive muscular atrophy the abnormal reactions are observed only in certain physiological groups, and indicate disease of the multipolar cells of the anterior cornua.

• In poliomyelitis, individual muscles and groups of muscles are attacked here and there in a random manner, without regard to distribution or function. Every muscle thus suffering from structural degeneration reacts abnormally to the current and points unmistakably to an irregular destruction of the nutritive centres.

In all these three forms of paralysis, and especially in myelitis, many modifications will be met with, and various complications, increasing the difficulty in the way of a definitely correct diagnosis, but a good anatomical knowledge and a familiarity with electrical methods will seldom fail to solve problems as to diagnosis that would otherwise remain unsolved. Peripheral paralysis, it may be remarked, is not always attended with abnormal reactions. In such cases we assume that whatever changes have occurred, while sufficient to modify the transmission of voluntary impulses, are insufficient to influence nerve- or muscle-nutrition.

Before presenting a few cases illustrative of the diagnostic value of electricity, I desire to remark that much experience convinces me that the two most important points relative to the subject are the presence or absence of farado-muscular irritability, and the presence or absence of galvano-muscular irritability. In the latter case the degree of the increase or diminution of muscular irritability is also

of importance as bearing upon the question of diagnosis. I do not by this mean to have it understood that the so-called reactions of degeneration are of no import. They represent exceedingly interesting and not unimportant phenomena, but they are by no means elicited with such precision and certainty as has been generally taught, and changes in the order of the normal polar opening and closing contractions are in general of no greater significance than the simple presence or absence of, or diminution in the readiness of, response to the two forms of current. The case here presented of double facial paralysis is an excellent illustration of the value of electricity in diagnosis, and is of especial interest because of its unusual character. The attack upon the right side of the face came on suddenly, and when the patient came under my observation he presented the characteristic symptoms of a lesion somewhere along the course of the nerve itself, with paralysis of the orbicularis palpebrarum muscle, thus preventing complete closure of the eye. There is no response to the faradic current, and this is an unmistakable indication that the nerve is affected somewhere along its course, and probably before it leaves the petrous portion of the temporal bone. To the galvanic current, on the contrary, the muscles respond with undue readiness, a strength of two milliampères—quite insufficient in a condition of health—causing very appreciable contractions in the paralyzed muscles. To what may this phenomenon be attributed? may be asked. This gives me an opportunity to explain a very interesting condition of things. Either current when applied directly to a healthy muscle causes contractions in about the same degree as when it is applied directly to the nerve that supplies the muscle. If, however, through the action of poison, or disease, or injury, the intra-muscular nerve-filaments become affected, leaving the muscular fibres untouched, the currents act very differently.

The faradic current produces no contractions whatever, for the reason that it acts only through the nerves themselves, while on muscular fibre deprived of its nerve influence it exerts no effect.

The galvanic current, on the contrary, calls forth contractions through its action both on nerve and muscle. In the case before us the facial muscles have been entirely deprived of their nerve influence, and therefore fail to react to faradic stimulation. The muscular fibres are, however, as yet healthy, and respond to galvanic stimulation, and, as is seen, far more readily than in health. Why this is so is conjectural, but the most rational explanation seems to be that this increased galvano-muscular excitability is due to some nutritional change in the

muscle itself, and perhaps to the absence of a certain inhibitory influence exerted by the healthy nerve supply. The differential action of the two currents on nerve and muscle may be thus stated. The faradic current more powerfully stimulates healthy nerve, and the vigor of the reactions is according to the strength of the current and the rapidity of the interruptions.

The reactions following the application of the galvanic current are very much the same, only less vigorous. When the muscle is deprived of its nerve influence the faradic current causes no contractions, whatever be the strength or rapidity of its interruptions, while the galvanic current not only causes contractions that are vigorous according to its strength and the rapidity of its interruptions, but excites them more readily than in health. The left side of the face of this patient is also paralyzed, and at first glance one would take it to be a case of peripheral paralysis also, from the fact that the patient finds it difficult to close the left eye completely. The diagnosis is, however, made perfectly clear the moment I subject the patient to the electrical test. To both currents the reactions are perfectly normal, thus indicating that the nerve itself is healthy, and that the lesion, whatever it is, is cerebral,—i.e., in or beyond the supra-nuclear space.

Any loss of function of the orbicularis palpebrarum muscle is very rarely associated with facial paralysis of cerebral origin: so rare, indeed, is the occurrence, that inability to close the eye is regarded as almost pathognomonic of a peripheral lesion. Nevertheless, this is not the only case of central paralysis associated with more or less inability to close the eye that has fallen under my observation, and serves to emphasize the utility of electricity in diagnosis. While the electrical reactions, or want of reaction, on the right side of the face of this patient indicate degeneration of the nerve structure, they just as plainly indicate no degeneration of the muscular structure itself.

Should this patient improve, as is most probable, the muscular irritability to the galvanic current will gradually diminish until it reaches its normal condition, and farado-muscular contractility will again become manifest. Should the galvano-muscular contractility become less than normal, it would indicate atrophy of the muscular fibres; and its total loss would show complete muscular degeneration.

The second case that I have to present has long been under my observation, and illustrates the condition of things to which I have just alluded.

The paralysis of the right side of the face came on rather gradually some four years ago, and has progressed to complete nerve- and almost

to complete muscle-degeneration. The faradic current is powerless to induce the slightest reaction.

A mild galvanic current of four or five milliamperes elicits no response, and it is only when the strength of the current is increased to twelve milliamperes that contractions are produced, and these are so feeble as to be hardly perceptible. The histological state of both nerve and muscle is thus quite clearly made out, and demonstrates the probable inutility of any further effort in the case.

Another case of which I will speak not only illustrates points of diagnostic value, but is an example as well of what can sometimes be accomplished by judicious and persistent treatment in certain unpromising cases. This girl, aged eighteen, was quite well in every respect previous to the attack which paralyzed her. She had been in constant attendance, night and day, at the bedside of her mother; and in getting out of her own bed at all times of the night, and often when in a profuse perspiration, she caught a severe cold. Her limbs gradually became heavy and unmanageable, and finally she lost the power of locomotion altogether.

When I saw her, some time after, at the solicitation of her physician, Dr. J. O. Farrington, the paralysis of the lower limbs was absolute and complete. Atrophy had taken place to a marked extent, and the patient was unable to move the limbs below the knees, or to flex or extend the toes. No response in any of the muscles of the lower limbs could be obtained by the use of the faradic current, nor to the galvanic current when it was applied to the nerve-trunks. A powerful current, however, when applied to the muscles, elicited faint contractions; but they were the reactions of degeneration, and indicated advanced degenerative changes in the muscular as well as the nerve fibre.

The symmetrical and profound character of the muscular degeneration, as indicated by the complete loss of farado-muscular contractility in every muscular group, and the almost complete loss of galvanic-muscular contractility, quite surely indicated a gross lesion of the cord, and not poliomyelitis, as had been previously suggested; for in this last-named disease the muscles are attacked in an irregular manner, corresponding to the irregular distribution of the pathological changes in the gray matter of the cord. There can be little question but that the disease was a myelitis, involving the lumbar gray matter. While the disease evidently occupied a considerable vertical extent of the cord, the presence of sensation in the extremities indicated that it did not involve the whole transverse area.

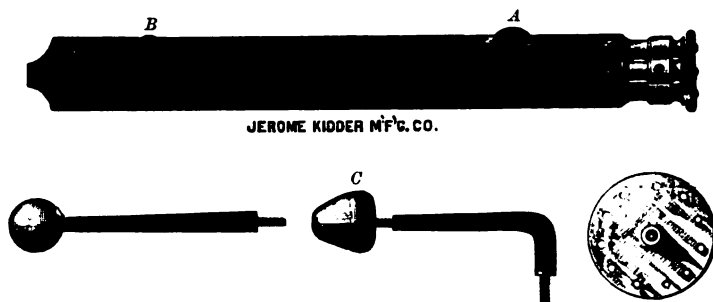
The prognosis in this case was certainly very unpromising, and but little hope was given of ultimate recovery; and yet recovery has taken place and is almost complete. The toes still fall a little in walking, but the weakness is so slight as not to interfere materially with locomotion. Nature has undoubtedly accomplished much in this case, but there can be no question that the persistent and judicious use of the constant current has greatly aided in the recovery.

A word in regard to the method to be employed in the prolonged treatment of cases of this kind. It is a great mistake to use strong and frequently interrupted galvanic currents. Our object is to aid nutrition, not to overstimulate.

I have known cases where the muscular irritability has become entirely extinguished, and limbs that might have regained more or less power of locomotion under judicious methods have become hopelessly paralyzed, through too violent attempts at muscular contraction.

The effects obtained by such methods are most undesirable, and, in their relation to nutrition, destructive rather than reconstructive. The continuous passage of the galvanic current is in a certain sense stimulating in its effects, but combines influences that are sedative and tonic and pre-eminently reconstructive, and is alone equal to the task of resisting progressive degenerative changes in nerve and muscle.

The electrode here presented (in two parts) is one that I have used with much satisfaction in eliciting the various abnormal reactions that are associated with the many forms of paralysis.



It will be observed that there are three binding posts to the right of the handle. The one marked *P* is to be connected with the positive pole of the apparatus; the other, marked *N*, with the negative.

The third post is to be connected with an electrode applied to some indifferent part of the patient's body. The small knob marked *A*, when moved towards *P*, renders the electrode *C* positive; when moved

towards *N*, the tip becomes negative. *B* is an interrupting button, which when pressed closes the circuit, and by sliding it slightly forward the circuit can be kept closed, when so desired, without effort of the operator. This form of electrode is exceedingly convenient in electro-diagnosis from the fact that by a single movement of the finger of the hand that holds the electrode the knob *A* is moved, the direction of the current instantly changed, and anodal and cathodal contraction elicited in quick succession.

There is one other point relating to electricity as a diagnostic agent which does not include the phenomenon of electrical reactions, but refers only to the question of the presence or absence of pain. It is not, perhaps, generally understood that there is a wide difference in the physiological as well as therapeutic effects of induced currents of quantity and tension. The induced current of quantity,—*i.e.*, the current from a short, thick coil of wire,—when applied to mucous surfaces which offer but slight resistance to the passage of the current, and especially if the bi-polar method of application is used, is powerful to cause muscular contractions, but has no power to relieve pain. The induced current of tension, on the contrary,—*i.e.*, the current from a long, thin coil of wire,—when applied internally, induces only feeble muscular contractions, but has a remarkably sedative effect in neurotic troubles. If there exists, however, a degree of inflammation or acute congestion, this so-called sedative current has little power to relieve, and if applied with much strength will aggravate the pain. If, therefore, in a given case of uterine or ovarian pain, or in a more generally diffused abdominal pain, the induced current of tension by the bi-polar method of application causes relief, we are justified in believing that the pain is of nervous origin, and a continuation of electrical treatment is indicated. If, however, the application increases pain rather than relieves it, it is quite certain that we are dealing with something more than a mere neuralgic condition,—that acute congestion or active inflammation is present, imperatively contra-indicating the use of electricity.

Neurology.

SOME FORMS OF MYELITIS AND OF SERIOUS SPINAL TRAUMATISMS.

CLINICAL LECTURES DELIVERED AT THE PHILADELPHIA HOSPITAL.

BY CHARLES K. MILLS, M.D.,

Professor of Mental Diseases and of Medical Jurisprudence in the University of Pennsylvania; Neurologist to the Philadelphia Hospital.

LECTURE I.

GENTLEMEN,—For years the subject of myelitis claimed much attention from teachers and text-books,—although, unfortunately, its consideration was largely theoretical,—and neural inflammations were scarcely thought of or discussed; but during the last ten years neuritis, and particularly multiple or diffused neuritis, has filled a large space in medical literature. Myelitis has been overshadowed; but it is a subject which should not be neglected even by the general practitioner of medicine. Pure non-traumatic myelitis, while not of frequent occurrence, is not rare.

I have here a specimen of the vertebral column with the spinal cord in position. The cord, you will observe, occupies only about two-thirds of the length of the spinal cavity, the several inches below containing the cauda equina, or leash of spinal nerves, which proceed to their various areas of distribution by way of foramina placed far below their points of origin. Roughly speaking, the spinal cord itself can be subdivided into at least four general regions,—a cervical, including the cervical enlargement, which extends from the oblongata to about the second dorsal vertebra; a dorsal or thoracic, from the second to about the tenth or eleventh thoracic vertebra; the lumbar enlargement, chiefly opposite the last two thoracic vertebræ, and the conus, which is the tapering of this enlargement. The regions of the cervical enlargement, and of the lumbar enlargement and conus, are, in some respects, of the greatest importance, as from them arise the nerves which supply the limbs, and, in the case of the conus, important pelvic organs. The lumbar-conus portion of the cord is crowded into narrow vertical limits, as the columns of the cord become less and less in bulk as we get lower, allowing important gray masses to be thus condensed.

The portion of the cord most liable to be attacked by acute non-traumatic myelitis is the mid-thoracic region. If the syphilitic or tuberculous infection, or the poison of any infectious disease, or any toxic agent, attacks the spinal cord acutely, it often shows the most virulence here. This may be due to some peculiarity of the blood-supply or to the lack of resisting power in this least organized region. It is rare in this hospital to see acute transverse myelitis confined to the lumbar or cervical enlargements, although localized poliomyelitis most frequently assaults one of these regions. When the enlargements are involved in a primary inflammation, it is usually by extension, the inflammation beginning in the dorsal cord.

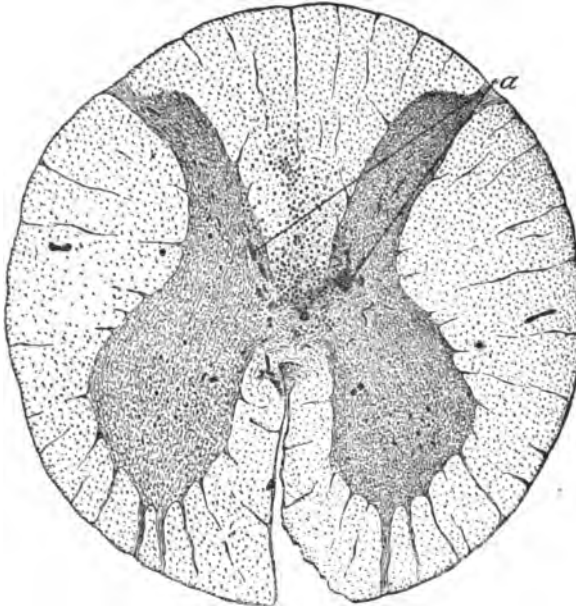
I shall first direct your attention briefly to acute transverse myelitis of this region. Transverse myelitis may be variously subdivided, according to the method of consideration of the subject; but a practically good plan is according to the apparent innate curability or fatality of the disease. I have had considerable personal experience with at least three varieties,—one rapidly fatal; a second destructive, from which the patient partially recovers but is left paralyzed permanently for years; and a third in which recovery takes place rapidly or at least in a comparatively short period.

RAPIDLY FATAL TRANSVERSE MYELITIS.

At the meeting of the American Neurological Association in 1892 I reported a case of fatal acute myelitis, mainly of the dorsal cord.¹ This patient, with an uncertain specific history, six months before coming under observation had had a large carbuncle between the shoulders, and for months had shown some tendency to drag his feet. Four days before he was first seen he was taken with severe pains across the loins; in thirty-six hours he could not stand, and twenty-four hours later he was completely paralyzed in both lower extremities and totally anæsthetic as high as the nipples, with incontinence of urine and fæces and abolition of knee jerks, muscle jerks, and skin reflexes; temperature rose rapidly to 104° and 105°, with corresponding increase of pulse and respiration. For a few days his serious condition did not change much, then rapid increase of symptoms took place, and he died evidently from cardiac and respiratory paralysis. The entire course of the acute attack was about ten days, and included a first period of rapid development lasting about four days, a second period of little change or advance lasting four days, and a final rapidly

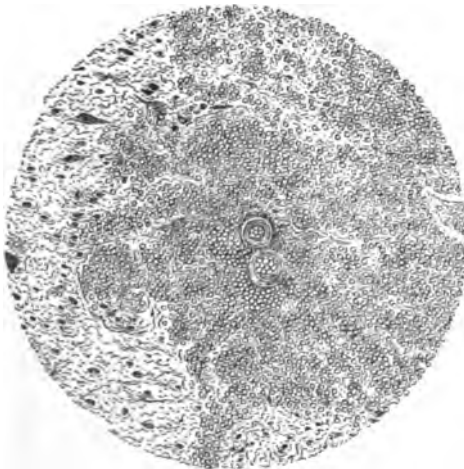
¹ *Journal of Nervous and Mental Disease*, August, 1892, vol. xvii., N. S., p. 657.

FIG. 1.



Section of spinal cord showing acute hemorrhagic myelitis; the vessels throughout the section are engorged with blood, but the hemorrhages are confined to the central portion. At some points, as at *a*, are considerable hemorrhages, while in and around the central canal the blood is extravasated throughout the tissues, the central canal itself being stuffed with red blood-corpuscles.

FIG. 2.



Acute hemorrhagic myelitis, showing hemorrhage into left of centre of gray matter, marked *a* in Fig. 1; small artery and its accompanying vein, which have been the origin of hemorrhage.

FIG. 3.



Acute hemorrhagic myelitis; portion of section of spinal cord showing hemorrhage into central canal.

fatal period of about two days. Autopsy showed acute transverse myelitis in the mid-thoracic region, where a shell of solid cord tissue surrounded a creamy mass. Towards both the cervical and the lumbar region the evidences of myelitis were less and less marked. Microscopical investigation showed the nervous tissue almost entirely destroyed, with distended blood-vessels, and many scattered hemorrhages. Figures 1, 2, and 3 are drawings by Dr. J. C. McConnell of microscopical sections prepared by Dr. C. W. Burr from the cord of this patient.

This case affords a good illustration of a rapidly fatal type of dorsal transverse myelitis, which was probably dependent upon pyæmic infection. Some cases run their course even more rapidly than this, lasting only three or four days. Active specific and supporting measures and counter-irritants were used, but without avail.

OLD CASE OF TRANSVERSE MYELITIS WITH SECONDARY DEGENERATIONS.

The second patient has been in the wards since 1878, and has been under my observation more or less during the whole of this time. I studied him first ten years ago. In 1878 he was in a theatre and fell, landing on the back of a chair, and a day or so afterwards felt sore in his legs. He attempted to keep on his feet, but three days afterwards fell, and found himself unable to walk, and he has not walked since. While on his feet he had no pain, but a sense of constriction. The records tell that in 1878 he had total loss of sensation and of motion in the lower limbs, with exaggerated reflexes. For months his legs were in a peculiar spastic state, so that he could not rest on his back, and his bed was arranged so that he could lie on his chest and side, with a contrivance to support his limbs, his feet pointing upward in the air.

This man has improved considerably after many years, and if he had been put to bed at once instead of going round for the first few days he might now have been on his feet. Gradually sensation came back, and little by little some motion, and even after fourteen years he is improving a little, and now can barely stand with some support. He has now perfect sensation. He has still some inability to control his bladder. His limbs are not much wasted, probably not more than can be accounted for by not being used. His muscles all respond to the electric currents. He has pronounced contractions, chiefly flexures at the knees and ankles. Ankle clonus, exalted knee jerk, and front tap are present, but the toe jerk is absent.

It should not be forgotten that in a long-standing case like this some of the most striking conditions present are due, not to the original acute disease or its direct consequences, but to secondary degeneration of the tracts of the cord below the region acutely affected. The crossed pyramidal tracts, particularly in a case of this kind, are degenerated; the phenomena present are indeed similar to those of primary lateral sclerosis, where the parts originally attacked by the subacute or chronic degenerative disease are the lateral tracts.

MILD TYPE OF TRANSVERSE MYELITIS.

The next case is a fair illustration of a mild and, under favorable circumstances, curable type of transverse myelitis. H. S., twenty-eight years old, a seamstress, has had six children, only two of whom are living, and it is suggestive that her health was good until the birth of her first child, but since has been bad, and that with each child she has lost her hair. Seven months ago she began to have trouble with her feet and legs, principally the left leg; first a feeling of heaviness, which became quickly worse, until both her feet and legs were numb and as though asleep. For two days she had complete loss of motion in both lower extremities; in her own words, she could not even move a toe. She had also for a brief time complete loss of sensation in the legs, and trouble in passing her water, requiring to strain very much, although it did not become necessary to use the catheter. This, so far as I can obtain it, is the history of the acute onset: as I have no record of examination made at the time, I must depend upon her own statements. After a few days she began to improve, and soon was able to walk, but she has never been quite strong in her legs since. Examination now shows no pain or tenderness and impairment of sensation. She sways on standing, and more on attempting to walk with her eyes closed. All movements are preserved in both lower extremities, but she shows some general weakness, and especially some loss of power on the left, most marked for dorsal flexion and abduction of the foot. Knee jerk and muscle jerk are very pronounced, but more marked on the left; front tap is present on the left, but not on the right; ankle clonus is decided on both sides; toe jerk is absent; electrical responses are normal.

COMPRESSION-MYELITIS PROBABLY DUE TO CARIES.

I have had considerable difficulty in getting any history from the next patient, both because of his ignorance of English and because of his probable mental deficiency. I have, however, obtained the fol-

lowing points before bringing him into the arena. He is a German, aged thirty-one, and has been in this country but a few years. He probably had some convulsive attacks, from what we have been able to learn, before the onset of the peculiar train of symptoms and conditions which we are now to consider. About three or four months ago he was working on a farm, and was probably much exposed and did not take good care of himself; he had a convulsion of some description. Since he has been in the hospital he has had one general convulsion, which was witnessed by one of the nurses in the ward, and he tells us that his previous attack was like this. He had pain a short time, especially in the abdominal region reaching to the back and below the umbilicus; he also had a sense of constriction. He began to be affected in a peculiar way in his limbs. This came on not abruptly but rapidly,—for you must make a distinction between abruptness and rapidity of onset,—and in a short time he lost power in both legs, and at the same time, to some extent, sensation. He next developed a peculiarly excitable condition of his reflexes.

He has now been in the wards some weeks, and is practically neither better nor worse than when he entered. When I ask him to draw up his legs, he is unable to do so; at least he does not do it, and he is apparently unable. His legs are as rigid as bars of iron, and when he makes an effort to draw them up they become locked at the knees and at the hip-joints. When I ask him to sit up, he meets with still greater difficulty. With these spastic patients we have to be very careful. Some time since we had a patient in the ward with a somewhat similar spastic condition, but who could stand; his limbs would suddenly lock and he would fall, and he cut his head badly several times in this way. This man's legs lock instantly in extension when he moves them, and they are also thrown into vibration; but with manipulation they can be again flexed. His limbs are almost constantly in a state of tremulous oscillation or vibration.

Beginning at his feet, we will test his so-called muscle and tendon phenomena, which are not purely reflex in every instance. Even the so-called toe jerk, which is rare, is marked here; we have also ankle clonus, front tap clonus, knee jerk (which is greatly exaggerated), and muscle clonus, from the quadriceps. Passing to the other reflexes, it is doubtful whether this man felt the point of the compass or not, and you must not be thrown off your guard by this. The cutaneous reflex from the bottom of the foot is marked; there is no particular response elsewhere. He has some sensory change, probably loss of tactile sensibility up to a certain height above the hips. I examined

him in the wards, but this was difficult to make out clearly. He feels painful sensations, and can tell the difference between heat and cold. His limbs are not wasted.

He has some incontinence of urine, and has some trouble with his bowels, thinking they are never moved, which may be a delusion, or may be due to anæsthesia of the rectum, which may not respond to sensory stimuli. He has no optic neuritis.

Summarizing, the chief symptoms referable to a spinal cause are abdominal pain and constriction, rapid loss of power in the limbs, with accompanying partial loss of sensation, excitable reflexes, a tendency to constant spasticity, with attacks of extreme spasm in the legs on every attempt at movement, and incontinence of urine. His legs are not wasted, and electrical changes have not occurred.

Everything in this case points, as in the other cases, to a lesion of the thoracic cord, but one differing in character from those we have considered. The dominating symptoms are those of compression and irritation. It might be a case of compression-myelitis from a rapidly developing extra-medullary tumor or an inflammation of the cord substance. It is most probably a case of compression-myelitis associated with rapidly developing caries of one or more of the thoracic vertebræ. The lesions causing compression of the spinal cord are usually fractures, growths, aneurisms, pachymeningitis, and caries; the last probably occurring oftener than any of the others. In caries, inflammation of the bone and its surroundings is present, and pachymeningitis often develops, and sooner or later mechanical compression from giving way of the bones. The attack of explosive spasticity in this man's case is to be explained by the irritation of the nerve-roots by an inflammatory process; most of the other symptoms by compression, although some may be due to limited destruction.¹

Independently of his history, his symptoms will scarcely bear any other translation. This man, without atrophic disorder of the muscles which are supplied by the nerves of the lumbar enlargement, has lost cerebral control over his limbs,—a loss which is due to the breaking of connection between his brain and the parts of the spinal cord which supply the lower limbs.

¹ It is now several months since the delivery of this lecture. This man soon became entirely bedridden, and recently died in the wards of my colleague Dr. J. H. Lloyd, having developed shortly before his death cauda-equinal symptoms in addition to those just related. Autopsy revealed dorsal caries and its usual accompaniments, much as anticipated in the lecture, and also invasion from a trophic eschar of the equinal region.

What else could this be except transverse myelitis, from compression or other cause? He may have a brain lesion, as he had convulsions, which are probably cerebral in origin; but no single cerebral or intracranial lesion could produce symptoms such as we have observed here. A small growth in a very unusual position in the pons might give many of the phenomena present; but it is inconceivable that you would then have uniform paralysis of the two extremities and uniform spastic phenomena, and that his arms and the upper part of his body should also be involved. He might have a double lesion of the cerebral hemispheres, involving only the cortical centres for the legs, but it is not probable; or a tumor in the longitudinal fissure pressing in both directions on the leg centres of both hemispheres, but that also is improbable. We have no evidence of caries of the vertebræ, and as a result localized pachymeningitis and compression-myelitis.

The convulsions and his mental state may be accidental concomitants, or a spinal affection may be superimposed upon a past cerebral state. It is true that in certain acute diseases of the spinal cord we occasionally have convulsions at the onset of the disorder. In one case reported three general convulsions, with unconsciousness, accompanied the onset of an acute myelitis. I have had one or two similar cases. I have in mind a patient who was attacked with myelitis and neuritis, and had almost universal convulsions in the very early stages of the disease, before it had rendered her incapable of using the limbs. So you see that we may have occasionally a history of convulsions with acute spinal disease. It is more probable in this case, however, that the patient had convulsions which had no connection with the disease we are particularly studying.

For the acute stages of any form of myelitis the treatment would be practically the same. First, let me again emphasize the fact that it is most important to recognize that the case is one of transverse myelitis. Nine out of ten cases probably are not recognized at first. They may be supposed to be simply cases of weakness, or of rheumatism, or of hysteria; or—which is most likely—they may not be diagnosticated until the patients are off their legs and much central mischief has been done. Later, the mistake is made too often of supposing the case to be necessarily hopeless. As soon as you suspect that a patient has beginning inflammation of the spinal cord, put him to bed, and keep him there. Even the position in bed is important. Put him on or towards his face, or on his side, arranging this, if possible, so that he will not be on a strain. The legs may be made dependent below the level of the bed. If you simply place the patient on his side he will

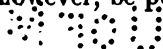
not stay there ; he needs more support, which can be had with a board, which should be padded. Keep him absolutely still. Use counter-irritation to his back ; and probably the best way to do this is by the alternate application of water at the temperature of 115° F. and ice-cold water, ten or fifteen minutes at a time, two or three times daily. Use either dry or wet cups, and have the bowels opened in such a way that it will not be necessary to move the patient much.

Internally, many remedies of questionable value have been used. Ergot is one of these, and reports differ as to the results obtained, although theoretically it should be of value. One of the best combinations of drugs in the early stages is probably that of the iodides, bromides, and ergot. Mercury is usually recommended, and seems to do good at times. If mercury is used, it should be in the form of inunction, or of calomel, kept up for some time.

Remedies such as salicylic acid, the salicylates, phenacetin, antipyrin, etc., which have been found so useful in neuritis, should also be tried in myelitis,—at least in its early stages,—although but little use has been made of them for this affection.

In transverse dorsal or lumbar myelitis serious accidents may arise. The tendency in myelitis of a certain type and of certain severity will be paralysis or paresis of the bladder walls, and perhaps of the sphincter. If of the bladder walls, there will be more or less retention of urine, and these patients also dribble sometimes ; the bladder gets nearly full and dribbles over, but a certain amount is left, which decomposes and sets up cystitis. The necessity of making careful examinations and catheterizing is apparent, or in a week or two you may have secondary myelitis or other constitutional conditions from infection. In catheterizing, of course, you should be careful to see that the instrument is perfectly clean. It may be necessary in certain instances to keep the bladder washed out with antiseptic solutions or benzoic acid, and to give morphine, with camphor water and belladonna, internally. Be on the watch for bed-sores, which may be of two kinds,—that is, from pressure, or trophic due to the cord disease. If the patient suffers much from the first variety of these, it will be your fault ; but, in spite of all you can do, trophic sores may appear. Everything should be done to prevent this, as by the use of air-cushions and water-beds, and of peroxide of hydrogen in washing out the sores, and of iodoform or a mild galvanic current to stimulate.

If, in spite of this treatment, the case goes on to a paralytic condition, the treatment will be different. The patient should not, however, be put on his feet too soon, and you should not give up all



hope of improvement even if he shows no signs of it for weeks or months. Keep him in bed from five to ten weeks, until you are sure no further improvement from enforcing quiet will take place. Now use tonics, as strychnine, and everything to improve the nutrition of the patient; and alteratives, such as hydriodic acid, may prove useful. He should be treated at intervals with the galvanic current, but too strong currents should not be used. Massage is useful, and should be applied skilfully and at first gently. Strychnine may be used hypodermically.

In compression-myelitis attention should, of course, at first be given to the source of the compression. If spinal caries is suspected, it is of great importance, and may save the patient, to put him in bed at the right time and treat him carefully by extension and other measures called for in this affection. In fractures and fracture-dislocations, extension and operation must be always carefully considered.

HEMIDROSIS; APHASIA DUE TO SUBCORTICAL HEMORRHAGE; VERTIGO OF CENTRAL ORIGIN; PARETIC DEMENTIA.

CLINICAL LECTURE DELIVERED AT THE VANDERBILT CLINIC.

BY M. ALLEN STARR, M.D.,

Professor of Diseases of the Mind and Nervous System, College of Physicians and Surgeons, New York.

GENTLEMEN,—Here is a man who shows the peculiar condition of sweating of the whole of one side of the head. As I touch him I can feel a very perceptible difference between the two sides, one side being moist, whereas the other is dry. Unilateral sweating is a rather uncommon affection. The sweating here cannot be ascribed to a paralysis of the vaso-motor nerves, as it can be in many cases. You can very well see that the man might have dilatation of the vessels and increased secretion as a result of that. You know that increased secretion of saliva is accompanied by great functional hyperæmia of the vessels in the glands. A paralysis of the vaso-constrictors will lead to dilatation of the arteries, and consequently to increased circulation in the skin at large, and, of course, in the sweat glands pertaining to the skin. We find such cases, but this does not belong to that category, because there is no apparent difference in the color of the two sides of the face. The ears are of exactly the same color that they have always been. Here then is a unilateral sweating of one side of the head, which cannot be attributed to paralysis of the vaso-motor nerves. We have to think, therefore, of those nerves that govern the secretion of sweat. There are such nerves; their existence has never been doubted, although they cannot be distinguished from other nerves under the microscope. You know very well that sudden fright will throw one into a tremendous perspiration, and you know very well that anxiety or grief is capable of drying up the sweat entirely. Abnormalities in the secretion of perspiration occur frequently in neurasthenia. So there must be some mechanism governing this secretion that is capable of being affected

by mental causes, and by causes that change the nutrition in the nervous system. Hence, when you find the condition of general sweating you usually look for a central cause affecting the mechanism which may be set into play by fright or anxiety. This case cannot be put in that category, because it is not general. Instead of affecting the whole body it is limited to a particular part. So there must be some irritation in the part that governs the secretion of sweat. Where that is we cannot say. It is possible that it may be in the medulla, because some cases with a lesion of the medulla were followed by great sweating, the lesion being in the floor of the fourth ventricle, near the tenth nerve nucleus. You may recall a case of Basedow's disease with marked flushing. In that case there was an increased secretion of sweat which made the body so moist that when we applied a current of electricity to the body of the patient the skin was so wet with perspiration that the resistance to the current was decreased, and she could bear only a weak current. Basedow's disease is probably due in some cases to a lesion in the floor of the fourth ventricle. In this man we have a history of trauma followed by sweating in a small part of the body. You will notice that the part affected is not the part governed by any one particular nerve. The nerve which supplies the face is affected, but so also are the occipital nerves. His sweating involves the entire right half of the head in front and behind. It is not limited to the face alone; it does not cease at the back of the head, and therefore it is not limited in its distribution to the parts supplied by the fifth nerve; it involves the area supplied by the occipital nerves as well. We cannot locate the cause in any one nerve in this case, because the entire head is involved. We do have changes in the secretion of perspiration due to nerve lesions. Thus, in multiple neuritis, especially the alcoholic form, I have often seen a great increase of sweat in the extremities. In this man we are thrown back upon a central lesion as the probable reason for the condition from which he is suffering. Now, such a condition might be due to a lesion, or it might be of reflex origin. We know that peripheral irritation constantly sent to a central organ results in great variations in that organ's action. This is manifested by irritation of some kind. We know that long-continued eye-strain may give rise to twitching of the eyelids and neck and to choreic movements of the extremities. We know that a hard secretion beneath the prepuce will often lead to fits or general convulsions, which are explained by an accumulation of irritation in the nervous system, the irritation being slight at first, but kept up a long time. It is not improbable, inasmuch as this man has had an injury of the

nose resulting in a deformity which has persisted ever since the blow, and inasmuch as this sweating has come on since that blow, that there is some irritation of the fibres of the fifth nerve in the nose. Some irritation of this side is being transmitted to the pons Varolii and medulla, especially the upper part of the medulla, where the terminal branches of this nerve end. You know that the fifth nerve is a very long nerve in the medulla, and has a very long nucleus, which extends through the entire pons and medulla some distance beneath the floor of the fourth ventricle. The different branches of the fifth nerve are connected with different parts of this nucleus. The branch of the fifth which supplies the forehead comes to a point about half-way down the pons. The second branch, the infra-orbital, comes to a portion of the fifth nerve nucleus lower down, and the lowest branch, the infra-maxillary, goes to the lowest point. The lowest part of the nucleus is continuous with the posterior gray horn of the upper cervical segment; hence irritation in it can spread downward to the cervical region. Now, the nose fibres of the fifth lie to the middle part of the nucleus of the fifth, and an irritation from them would come in at the point near where the tenth nerve nucleus lies, in which are located the vaso-motor and sweat centres of the entire body. My diagnosis then is a reflex irritation in a part of this nucleus due to the disease in the nose. This is hypothetical, but it is the only explanation I can offer. He is being treated for this condition now, and is going to Dr. Lefferts to have the septum sawed out. [The relief of the nasal irritation caused the sweating to cease.]

APHASIA DUE TO SUBCORTICAL HEMORRHAGE.

CASE II.—This man has been sick for two months; before that time he was quite well. His attack began suddenly about one o'clock in the morning. He could not speak. He remained absolutely speechless for a week, then speech began to return, and he could say "yes" and "no." He seemed from the very first to understand what was said. He is able to read, and reads the papers every day, that being his only employment at present. At first he had headaches, but he does not have them much now. He has dizziness at times, and you see the difficulty the man has in articulating what he wants to say. He appeals to his wife to speak for him. He speaks with difficulty, but you can understand what he says, although it will be only one or two words at a time. He cannot frame long sentences. At first he was unable to write, but now he can write well. Agraphia usually accompanies motor aphasia, but if that is of slight degree the agraphia is apt to

wear off. This man was unable to talk or write for two weeks. You notice also the peculiar emotional state in which he is. He has shown something of a lack of control at home, and even here his eyes fill with tears. He laughs easily, and he cries like a baby. I have seen patients yield to that inclination to cry under similar circumstances to an extreme degree,—to such a degree that they could not say the most commonplace thing, even “yes” or “no,” without crying. Lesions in the frontal lobes are commonly accompanied by lack of power of self-control. This is particularly so in the left hemisphere when speech is involved. As he laughs, the right side of his face shows a little falling; there is but slight, if any, affection of the tongue, therefore little paresis; there is no paralysis in any part of the body, so that the only thing you have to deal with is pure motor aphasia, partial in character and with lack of self-control. We can rule out a tumor, because of the sudden onset. As he is fifty-five years of age, we might suspect endarteritis. He has a rather high-tension pulse, with atheroma of the arteries, and this would lead us to examine the urine. If there were a low specific gravity and albumin, the condition would, in all probability, be cerebral hemorrhage due to chronic endarteritis, and the only question would be whether that endarteritis is one affecting the entire system including the kidneys, or whether it is an endarteritis with miliary aneurisms in the brain which have ruptured. The examination shows the urine to be normal: hence we can rule out chronic Bright’s disease. The lesion can be located in the third frontal convolution or near it. The question is, is it cortical or subcortical? I should say subcortical, because if it were cortical the aphasia would be permanent. Here recovery has taken place, and recovery from aphasia takes place only when the lesion is in the tract between the third frontal centres and the pons. The third frontal convolution of one hemisphere is connected with the third frontal convolution of the other hemisphere by fibres that pass over through the corpus callosum; we know also that the tract from the third frontal convolution enters the internal capsule and passes down to the pons and medulla; the impulses of speech in passing down go through this tract to set in motion the various muscles controlled by the nuclei in the floor of the fourth ventricle in the pons and medulla. Suppose you have a lesion involving the entire third frontal convolution and the motor-aphasic area, or that you have a subcortical lesion cutting off the commissural fibres, and also the fibres going to the pons, then you have total motor aphasia. If the lesion, however, is in the internal capsule, we find, as a matter of fact, that these patients recover their speech

in part. There is no entirely satisfactory explanation of this fact. It is a curious thing that when the tract is all right on one side, speech is recovered. This is said to be because the impulses are switched over through the commissural fibres to the other side, where they are again switched off on to the descending tract and pass down : so that in that way the impulses get around the clot. If this explanation were correct, we ought to see an analogous condition from hemiplegia ; we ought to see a partial recovery. But we do not. My theory is that there are cases in which the lesion is so small that some fibres have escaped : so I suppose some of the direct fibres have escaped in the case of this patient. I think that is a more natural explanation. It is well known that in lesions affecting the anterior portion of the internal capsule aphasia occurs. You know that a number of these fibres pass down through the internal capsule, and it is a matter of fact that if your lesion is in the anterior part of the capsule in the fibres passing from the frontal region down into the pons Varolii, that is, in the frontal cerebral tract, you will have the same manifestation as in the frontal lobe lesion,—namely, a disturbance in speech and in mental powers. So a lesion in the anterior limb of the internal capsule, affecting some of the fibres that come from the frontal lobe, may be present in this case. I suppose this aphasia is due to a subcortical lesion that is small, so that the man has a good chance of recovery. These are the easiest cases for diagnosis, and are very interesting.

VERTIGO OF CENTRAL ORIGIN.

CASE III.—This man has been complaining for three months. He cannot hear on the left side, and has vertigo and some trouble in the back of the head, which is worse on the left side. There is also some pain in front. The condition, then, is one of pain in the head, deafness in the left ear, and a sensation of vertigo, referred chiefly to the left side. The man on examination has a good drum-head and a normal ear. Bone conduction to the acoustic nerve is, however, very imperfect, tested by a tuning-fork. His deafness is therefore central. This trouble coming on very suddenly has to be referred, not to the external or middle ear, but to the internal ear, or to the nerve from it to the brain. We have to deal here with a case such as is not very frequently seen. The condition has been called Ménière's disease, which is of sudden onset, a sudden deafness followed by pain in the head and a marked degree of vertigo. The question arises, to what is it due? Ménière described the condition many years ago, but we have to distinguish at present many conditions associated together under

that name, and whether this man has it is a question. Vertigo, we know, is a symptom that may be due to many different conditions within the head. The last patient had motor aphasia, and had severe attacks of vertigo occasionally. This man has vertigo with deafness and headache. Whether that vertigo is from the ear or from the brain, we have to determine. We have a mechanism for determining our situation in space. This mechanism involves a number of different organs, chief among which are the semicircular canals in the middle ear. The nerves from these pen in the acoustic nerve, which goes inward to the medulla, ends in the pons, and from there impulses pass up into the cerebellum. There is a nucleus on the floor of the fourth ventricle that receives impulses from this part of the acoustic. Lesions of the semicircular canals will lead to vertigo. Experiments on rabbits and dogs show that. You get different effects by dividing different canals. No interference with the function of hearing is associated with this vertigo; but if you have nerves for the canals running into the brain and transmitting impulses from them, it is evident that you can get vertigo from pressure upon these nerves which will be similar to vertigo arising when the canals themselves are affected. Such vertigo, however, will be associated with deafness. Thus, in tumors of the pons, and where the pons is pushed to either side, the nerve being pressed upon, you have vertigo and deafness. In basilar meningitis the nerve is pressed upon by the thickening about it, and then symptoms appear. Furthermore, we find that lesions in the medulla, small tumors, or hemorrhages, anything affecting the medulla at the point of termination of the nerve, will produce vertigo. When the irritation is in the pons or the termination of the nerve, the tendency of the patient is to feel as if he were falling to the opposite side, and consequently he turns himself towards the side of the lesion. If I have a tendency to fall to the left side, I will go to the other to correct that tendency. The result is that every lesion in the right half of the pons would lead me to fall to the left, and as I was falling to the left I would throw myself to the right to correct it, and therefore I would go to the right. So every patient turns towards the side of the lesion when the pons is irritated. It is a voluntary movement to correct the tendency to fall. On the other hand, when the pons is destroyed by disease, the patient staggers away from the side of the lesion. We find the nucleus in the pons is connected with the cerebellum. Lesions in the cerebellum have for a symptom vertigo, which leads us to stagger to one side. I have shown you cases of tumors of the brain in which vertigo was a symptom. In one of these, a man, there was

also vomiting and staggering to the left side. He had pain in the occipital region, and pain and tenderness of the right occipital bone. There we made a diagnosis of tumor in the cerebellum on the right side, with destruction of pons fibres and staggering to the side opposite to the tumor, and we found the tumor after death. So conditions of the cerebellum, affecting the terminations of this nerve from the semilunar canal, will cause vertigo. There may be an affection of the nerve going up through the middle peduncle of the pons from Deiters's nucleus to the termination of the tract in the vermiform lobe in the cerebellum, but if that is involved there will not be deafness with the vertigo. Now, Ménière was not familiar with all these details of nervous anatomy, and, while he presented as much as was known in his day, he did not know these facts. Hence in all cases a sudden onset of vertigo, associated with pain and disturbance of hearing, was referred by him to the ear; but it is really, in many cases, due not to hemorrhage into the semilunar canals, as he supposed, but to lesions in the pons or cerebellum. There is nothing more difficult to determine than the location of the lesion in these cases. I am not sure that this man has trouble in the cerebellum, or that he has any organic disease, but the sudden onset suggests it. Cases of marked disturbance of equilibrium may be caused by functional disorders; hence we see cases of neurasthenia and anæmia with these symptoms markedly developed. So, too, we have vertigo of gastric origin from irritation of these same nerve-centres in the pons reaching them by way of the vagus nerve. In such cases there is rarely any deafness. I have seen a number of cases where the patient has been deaf several years or months before the onset of the other symptoms: so you cannot always bring deafness into connection with the vertigo and headache. In this man the conduction of sounds, as tested by the tuning-fork, shows that the acoustic nerve is diseased. When we send a galvanic current through his acoustic nerve, his hearing-power is increased, but the current increases the vertigo. These facts lead me to think that in his case we have to deal with a central affection, not merely with a hemorrhage into the semilunar canals. It is a very difficult thing to determine whether the trouble is in the ear, or in the acoustic nerve, or in the cerebellum, or whether it is functional or organic: so the physiology is interesting, but the diagnosis is a very difficult one to make. As to treatment, almost any form of vertigo can be relieved by giving the patient potassium bromide in ten-grain doses three times a day.

PARETIC DEMENTIA.

CASE IV.—This man comes complaining of his head. His wife tells us that he cannot talk as well as he used; he thinks he was well until four months ago. The trouble in speech came on suddenly. He can repeat the letters of the alphabet. I ask him to repeat the words "Third Artillery Brigade," and, you see, he does so quite awkwardly. As his tongue is projected, you notice a very marked tremor in it, and not only that, but also a more or less marked trembling about the lips and face. There is tremor on intention; the movement increases and spreads up to the sides of the face, becoming very much more marked; his hands tremble, the knee-jerks are increased; he walks as well as ever; his memory is not so good as it was. In making the diagnosis of brain-disease, you have to get at the symptoms in an indirect manner. When a man who is questioned as to the duration of his illness, which dates back but four months, asks his wife for the information, you can rely upon it that in that particular patient there is some defect of memory. When you ask a patient if his memory is good or not, he may not be conscious of defects. Many will deny the imputation of loss of memory, and say they recollect things, but if they appeal to others, as this man asks his wife, you may be certain there is some defect. This man becomes excited easily, his face flushes, and he loses patience at the least provocation. He laughs at the silliest things. He never cries; though he feels depressed a good deal, and his despondency increases as he sits brooding at home. A lack of mental control is quite evident. There is only one other thing to notice, and that is the anxious expression about his eyes. His wife has noticed this. You have also noticed the flatness about the face, and the lack of expression, unless he is excited, when there is an over-action. These symptoms, taken in connection with the tremor of the tongue, the peculiar tremor of the hands, and the lack of memory and self-control, constitute basis enough for the diagnosis of chronic encephalitis or inflammation of the cortex of the brain, the ordinary name for which is paretic dementia, or general paresis, or, commonly, softening of the brain. Do not forget that in such cases you must find both physical and mental symptoms before your diagnosis is sure.

LESIONS OF THE POSTERIOR COLUMNS IN THE MEDULLARY SCLEROSIS OF ATAXIA.

CLINICAL LECTURE DELIVERED AT THE PARIS MEDICAL SCHOOL.

BY PROFESSOR DEJÉRINE,

Physician to the Hospice de Bicêtre; Professor (agrégé) in the Paris Medical School.

GENTLEMEN,—You know what lesions are found in the spinal cord in subjects who have presented more or less of Duchenne's malady during life. The sclerosis of the posterior columns and the atrophy of the corresponding roots always exist, but, while the characteristic features of these lesions have been known for a long time, their exact pathology is still under discussion. There are two things to consider in the medullary lesions of tabes,—their nature and their topography. It is this last that it is especially important to study. It is just here, as in all cases of sclerosis of the spinal cord, that we should devote our attention. Friedreich's malady is an exception: we proved with Dr. Letulle, in 1890, that in that disease the nature of the lesion does not present anything special.

In tabes, the lesions are found in the neuroglia, the vessels, and the connective tissue.

In order to interpret in a satisfactory manner the topography of tabetic sclerosis, we must not only examine the different regions of the cord in the same case, but also compare preparations coming from other cases, which may be different in their evolution or symptomatology. This done, we can then compare the lesions we find with those that are observed in the spinal cord after alteration of the posterior roots, whether these be experimental or pathological in nature.

Here are preparations from three cases of tabes (locomotor ataxia) who died in our service. In the first case there was a tabes which commenced in the dorso-lumbar region and later reached the cervical region. That is the usual form. The second case was a cervical one, in which the symptoms—pain, incoördination, and troubles of sensibility—affected the superior members mostly. The inferior members

were normal. The preparations of the third case come from a patient who, following a papillary atrophy at the onset, never had any further evolution of the disease. After fourteen years of fulgurating pains in his legs, he had no trace of incoördination.

These are the three usual types of tabes: the first, or ordinary type; the second, or cervical; and the third, that remains in the pre-ataxic stage, the spinal lesion not advancing.

What is the state of the spinal cord in these cases?

In the first, or ordinary case, you will find, about the level of the lumbar region, that Burdach's and Goll's columns are entirely sclerosed. About the level of the dorsal region the lesions remain nearly the same, but at the inferior portion of the cervical region you will find

FIG. 1.



Common tabes, lumbar region.

FIG. 2.



Common tabes, cervical region.

FIG. 3.



Cervical tabes, cervical region.

FIG. 4.



Cervical tabes, dorsal region.

FIG. 5.



Cervical tabes, lumbar region.

that the aspect is changing, and this continues as you go higher. Though the columns of Goll are invaded completely here, Burdach's columns are not, for in them the lesion diminishes as we ascend the cord.

The atrophy of the posterior roots follows the same course, and they show less change as we ascend the cord. Here are preparations of the cord in cervical ataxia (or tabes). Throughout the cervical region and the superior dorsal region the nervous fibres have completely disappeared in Burdach's columns, but they begin again about the level of the sixth dorsal pair. From here the lesion diminishes from above downward, so that at the lumbar swelling the lesion is hardly seen. As to the columns of Goll, in the cervical region they are altered only in the anterior two-thirds, while the posterior third is normal. These

alterations diminish so that at the lower lumbar region they can be considered normal. The posterior roots undergo the same change as Burdach's columns; that is, they diminish progressively from above downward, as to the alteration, and become almost, if not quite, normal in the lumbar region. It is only after staining the sections with osmic acid that we can find a very few fibres atrophied.

Let us now examine the third case, in which the tabes had remained for fourteen years in a preataxic state with blindness. In the lumbar region the sclerosis occupies Burdach's columns, Lissauer's zone, and the radicular zone, while Goll's columns are attached in their anterior two-thirds only. On the contrary, in the cervical region, Goll's columns are attacked with sclerosis in their posterior two-thirds only, while Burdach's fibres are normal.

Here, again, the alterations of the posterior roots are proportional to those of the rest of the cord. They are well seen in the dorsal and lumbar regions and absent in the cervical region.

We have, then, three cases of tabes in which the lesion presents itself with a topography somewhat different in each case. In the first, or ordinary tabes, the columns of Goll are as much sclerosed in the cervical region as in the dorsal and lumbar regions, while the sclerosis of Burdach's fibres diminishes from below upward in the cervical region. In the second case, cervical tabes, the lesion diminishes from above downward. In the third case, tabes arrested by blindness, Burdach's columns are altered only in the dorso-lumbar region, while the columns of Goll are less affected, and yet they are completely sclerosed in the two-thirds of the posterior cervical region. One single feature they have in common: that is, the alterations of the posterior roots follow the other alterations.

How shall we interpret this different topography? Is ataxia a systemic and primitive sclerosis of the posterior cord, as Charcot and Strümpell admitted, and as Fölsig and Raymond held?

To answer this question we must go into the history of the posterior cornu or horn in the sclerosis of tabes. Bourdon and Luys (1861) first described the pathological anatomy of Duchenne's malady, and for a long time we had no better description. In 1872 appeared Pierret's work, based on a study of the spinal cord in tabes. He showed that ordinary ataxia commences in the external bands of the posterior cornu. These have since been called Burdach's columns. The isolated sclerosis of the columns of Goll in the cervical region, observed in these cases, was seen only when the sclerosis of the lumbar region was very pronounced in character. This sclerosis of the columns of Goll, says

Pierret, is produced by a process of *secondary* ascending degeneration. While the theory of the secondary degeneration of Goll's columns was tacitly accepted, at this time, by a large number of neurologists, these lesions have been carefully studied of late years, and the accuracy of the original investigations clearly demonstrated.

The idea of a *primitive sclerosis of the posterior columns*, which made its evolution *in situ* and of its own will, did not, however, seem doubtful to clinical observers who followed experimental physiology. Waller's experiments were, in fact, a contradiction to the generally accepted idea. Vulpian, in 1879, expressed himself as follows: "We must admit that the alterations of the posterior roots are primitive. It may be that they are so only in a certain measure."

According to this, Vulpian was not far from admitting that in *tabes* the lesion of the posterior cornu is the consequence of the alteration of the roots. At this time embryology had not shown that the fibres of the posterior cornu are developed at the expense of the spinal ganglia, and the study of the posterior fibres had not yet been begun by section of the roots. Only one thing prevented Vulpian from admitting that the lesion of the cord in *tabes* was consecutive to that of the roots; that is, that there existed lesions of the cord without alteration of the roots. This question of the rôle played by the posterior roots was left undisturbed for some years, until Leyden, in 1889, took up his former conception, to the effect that this disease is an affection of the sensitive fibres of the cord.

We first promulgated our theory in 1889, in a series of lectures before the Faculty of Medicine. *We held that tabetic (ataxic) lesions were only the prolongation of the process into the posterior cornu of the corresponding roots.* We announced this theory after a study of the topography of the lesion, and of the proportion, which is constant, in the cases of *tabes* examined especially in relation to possible alterations of the roots and the posterior cord. We also compared the work of Tooth, who showed by experimental physiology that the lesions of the cord were as we have stated. His, by embryonic studies, has proved that the posterior columns are developed at the expense of the spinal ganglia. So we concluded that the lesions of *tabes* were the consequence of the lesions of the posterior roots. In 1890 we had occasion to say, in a work on paralysis during ataxia, "To-day *tabes* appears to be less and less a malady that is localized in the spinal cord. The peripheral nerves, both sensory and motor, are constantly found altered in character; besides, the lesions of the posterior columns are always proportionate to the lesions of the corresponding roots. In

other words, *there is nothing to prove that the spinal lesion is primitive. It is most likely secondary, being a consequence of a neuritis of the posterior roots.*"

This new conception of the malady has met with some opposition. Dr. Babinski, in his lessons, in Professor Charcot's wards, on peripheral neuritis, said that "sclerosis of the posterior columns in certain cases is preceded by the lesions in the posterior roots." Blocq gave the same reason for opposing our ideas. But Marie and Redlich, after twenty post-mortems, found that we were correct. Neither of these authors had heard of the theory which we had already advanced, but they came to the same conclusions.

In order to show that the lesions of the cord in ataxia are simply those of the posterior roots, we will compare them with those produced by experimental physiology. Taking first the case of compression of the terminal nerves of the cord in men, following a tumor or even a traumatism of the end of the vertebral column, we find that the lesions occupy the posterior columns only, and constantly present the same topography.

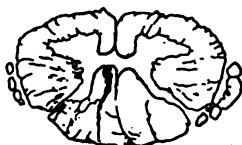
Here you notice that Goll's and Burdach's columns are totally sclerosed in the lumbar region, just as in tabes. In the dorsal region the columns of Goll are still in the same state, but those of Burdach are so only in their internal half. In the cervical region Burdach's columns are normal, and Goll's are affected only in their posterior portion. So that in compression of the cauda equina the posterior roots are altered in character, and the sclerosis which occupied the whole of the posterior column in the lumbar region is limited more and more to the posterior half of the columns, until, in the cervical

FIG. 6.



Root paralysis of brachial plexus: compression of first and second pairs, left side (Pfeiffer).

FIG. 7.



Root paralysis of brachial plexus, cervical region (Pfeiffer).

region, it no longer occupies any part but Goll's columns, and here only the posterior half. Compare this with Figs. 4 and 5, in tabes, and you will see that there is no real difference between them.

If you compare the accompanying drawings (Figs. 6 and 7), taken from Pfeiffer (1891) with the preparations of cervical tabes, you will

see the relation of these cases. Pfeiffer describes a case of radicular paralysis of the brachial plexus, called in German "the Klumpke type."

You will notice (Fig. 6) that the zone of degeneration occupies the external portion of Burdach's columns, just at the level of the posterior roots, and as the preparation is taken from higher up (Fig. 7) in the cervical region, the columns of Burdach are intact in the outer three-quarters, and altered only in the inner quarter, which is close to Goll's columns.

In one word, the topography of this lesion is the same as that of cervical tabes, and experimental physiology shows us that in old cases of this kind where the columns of Goll take part in the lesion the posterior parts of these columns remain clear of trouble.

We know from the experiments of Wagner, Tooth, Singer, Munzer, Barbacci, Oddi, Rossi, and Berdes that the posterior columns of the cord are affected.

Why does this alteration occur in the roots? It must be admitted that we do not know much about it. From this comparative study but one definite conclusion can be drawn,—namely, that in ataxia the spinal lesions are not primitive, but are a systematized sclerosis of the posterior roots, following the intra-medullary tract, which we believe to be primitive in character.

SIMPLE NEUROMATA.

CLINICAL LECTURE DELIVERED AT THE MIDDLESEX HOSPITAL, LONDON.

BY J. BLAND SUTTON, M.D.,

Assistant Surgeon.

GENTLEMEN,—It is important to remember that the term neuroma is often employed clinically in the same sense in which it was used by Odier in the beginning of this century, to indicate *a tumor proceeding from a nerve*. More accurate knowledge of the minute structure of tumors connected with nerves has taught us that they may be sarcomata, or fatty tumors, or be composed of tissue identical in structure with the endoneurium and perineurium, or consist largely of myxomatous tissue.

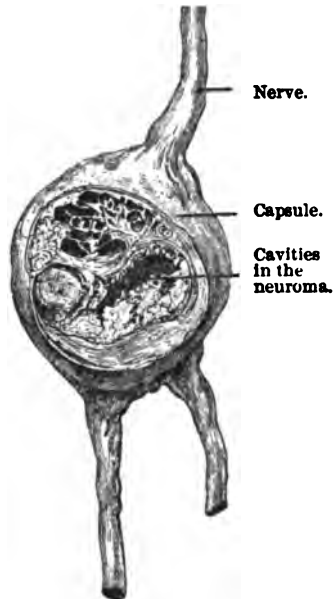
Up to the present time, aided by all the best methods of histological research, no one has detected a tumor (apart from amputation bulbs) connected with a nerve composed of new-formed nerve-fibrils. Taking these facts into careful consideration, a neuroma should be defined as *a tumor growing from and in structure resembling the sheath of a nerve*.

A neuroma may grow from the sheath of any cranial or spinal nerve; usually the nerve is spread over the tumor like a strap; the nerve may traverse the neuroma,—this is rare,—or it may grow within the nerve and spread out its fasciculi like the ribs of an umbrella or a fan. In shape they may be rounded, obovate, or like spindles. The roots of the spinal nerves are sometimes beset with neuromata which take the form of ring-like segments imperfectly demarcated, so that they resemble the annulated rootlets of *ipecacuanha*.

In the early stages the tissue of a neuroma is dense and resembles the tough tissues of neurilemma: all neuromata are furnished with capsules continuous with and derived from the sheath of the nerve from which they arise. Later, parts of these tumors undergo degeneration, and in large tumors the central parts liquefy. Thus the terms fibromata, myxomata, and cystic fibromata often applied to these

tumors are of no taxonomic value. They may all be classed as simple neuromata or neuro-fibromata. There is a very extraordinary species which is known as plexiform neuromata; but with these we have no concern at present, nor with those rare cases in which neuromata occur in scores on the nerves of the same patient; but to-day I must limit my remarks to the simple species of neuroma of which several examples have presented themselves in my practice, and some which you have had opportunities of examining. Bear in mind, neuromata are not common tumors: if you take our hospital reports you will find that in this institution, where we deal with large numbers of tumors, the average number of nerve-tumors is not more than two annually. Consequently, it is not unusual when a neuroma comes to hand for mistakes to be made in diagnosis: hence I propose to show you how errors arise, and how important it is to be vigilant when removing apparently simple tumors lying in the track of large nerve-trunks. The first neuroma I ever removed was of interest from this point of view. A young woman came to the outpatient room for advice concerning a small swelling on the back of her right wrist, situated near the styloid process of the radius; this swelling was smooth, rounded, non-adherent to the skin, painful when pressed, and exhibited all the clinical characters of a synovial cyst (ganglion), except that it did not disappear when the wrist was extended. From a superficial examination I concluded that it was a cyst arising as a diverticulum from the synovial membrane between the radius and the first row of carpal bones, and, as it had existed two years, I thought this would explain the thickness of its walls and its non-disappearance when the wrist was extended. I punctured it with a slender knife, but this had no effect on the swelling, and did not give the patient much pain: it was clearly a solid tumor. Cocaine was injected into the skin covering the tumor, which was then exposed by a free incision. It was discovered to be a neuroma connected with the radial nerve as it

FIG. 1.



A neuroma from Scarpa's space connected with the trunk of the anterior crural nerve. The tumor has a distinct capsule; the cavities are due to degenerative (myxomatous) change.

lies in the triangular space bounded by the tendons of the extensor primi and extensor secundi internodii pollicis. The neuroma, as large as a ripe cherry, was then dissected from the nerve without any difficulty, the wound rapidly healed, and there was no impairment of the sensation of the hand. Judging from a study of the literature relating to the subject, it would appear that the wrist is a very unusual situation for neuromata.

They are by no means uncommon on the intercostal nerves. In one of my cases, a woman thirty years of age complained of a lobulated tumor occupying the eighth intercostal space on the right side in the axillary line, which was a source of trouble and pain to her because preventing her from tightening her stays. The tumor was shaped like a dumb-bell; the extremities were as large as the top of the middle finger, freely movable, and non-adherent to the skin. Several who examined the patient regarded it as a fatty tumor, but its mobility, its situation (deeply in the intercostal space), and its painfulness induced me to regard it as a neuroma. On incising the skin, the tumor was found lying between the external and internal intercostal muscles, connected with the nerve by a stalk: it was easily removed.

Some of you will doubtless remember a woman of twenty-eight years, recently under my care, who complained of a painful swelling in the bend of the elbow, which on account of its situation, lateral mobility, the depth at which it was situated, and the pain it caused in the fingers when pressed or even lightly manipulated, led several of us to think the tumor was a neuroma of the median nerve. Under this supposition I cut down upon it, and found a tumor in the substance of the supinator brevis muscle the size of a marble; it was slightly adherent to the sheath of the brachial artery just at its bifurcation. On microscopical examination it turned out to be a gumma. After a most careful interrogation we failed to get a history of syphilis, but a year later the woman again came under observation with a similar tumor higher in the arm, which quickly yielded to iodide of potassium internally, and thus confirmed the opinion as to the syphilitic nature of the swelling in the supinator brevis muscle.

It is somewhat curious that neuromata rarely produce pain unless touched; then the sensations are usually very acute. Probably of all nerves the trigeminal is the one most liable to be the seat of neuromata, and even on such a sensitive nerve as this they rarely produce much suffering; but there are conditions under which they render life unendurable. Smith in his admirable monograph on "Neuroma" describes the case of a woman who complained of severe pain in the

course of the right trigeminal nerve, which was so increased by mastication that she ate but little; speaking aggravated the pain to such a degree that she always remained silent unless interrogated, and frequently on these occasions she replied by signs. The patient died after enduring severe and uninterrupted pain during four and a half months. At the post-mortem examination a neuroma as large as a walnut occupied the situation of the right Gasserian ganglion. It is probable that the intense pain experienced by this unfortunate woman was due to the fact that the tumor grew in a confined situation. This view was impressed upon me by the following case:

A woman twenty-two years of age complained of very severe pain confined to the region of the right upper jaw. Notwithstanding the intense pain (which at night amounted to agony) this patient complained of, the region of the face supplied by the palpebral, nasal, and labial branches of the right infraorbital nerve was anæsthetic; a slight thickening could be made out by the finger along the lower margin of the orbit, and there was a slight upward displacement of the eyeball. On examination, the skin supplied by the temporal twig of the orbital branch of the second division of the fifth nerve was found to be normally sensitive; this was also true of the mucous membrane supplied by the posterior dental branch of the same nerve. The symptoms were best explained by supposing the right infraorbital nerve to be entangled in a tumor connected with the roof of the antrum or floor of the orbit. Acting on this hypothesis, I reflected the skin of the cheek, and on cracking away the anterior wall of the antrum I found the cavity occupied by a gelatinous sarcomatous-looking tumor. The parts were freely removed, including the Gasserian ganglion. The pain was immediately and permanently relieved. On investigating the tumor it turned out to be a neuroma growing from the infraorbital nerve and invading the antrum; in the main it consisted of myxomatous tissue. A neuroma of this character on a limb-nerve would have been painless save when submitted to pressure, but imprisoned within the unyielding walls of the maxilla it was subjected to unremitting pressure, and was in consequence the source of continual pain.

It by no means follows because a neuroma is seated upon a sensory or a mixed nerve that it will be productive of pain. I have seen these tumors on the supraorbital and lingual nerves, but they gave rise to no painful sensations, and cases have been described in which neuromata grew on the cords of the brachial plexus, the median nerve, and the greater sciatic nerve unaccompanied by pain. When springing from the

trunk of a motor nerve they are painless ; it is important to bear this in mind, as a neuroma has been observed on the trunk of the facial nerve in the parotid gland ; the tumor was removed under the impression that it was an ordinary parotid adenoma, and permanent facial palsy was the unfortunate consequence. Cases have been reported in which surgeons have removed tumors from the forearm which had been absolutely painless, and subsequent examination showed that in the course of the operation a large and important nerve, such as the median, had been completely severed. This is very unsatisfactory, and could be avoided if surgeons realized that neuromata are encapsuled tumors, and when situated in the immediate neighborhood of large vessels, and upon important nerves, admit of easy enucleation, as the following case will show.

A single woman, thirty-five years of age, was placed under my care for a tumor of the mamma. On examining it there was little doubt that it was a carcinoma, and whilst examining the axilla for enlarged lymph-glands I perceived a tumor in the supra-clavicular region. Manipulation of this tumor provoked pain, not in the neck, but in the ball of the thumb and in the tips of the thumb and fore-finger of the same side. The patient was an intelligent woman, and stated that the tumor in the breast had attracted her attention only a few months, whereas the cervical tumor had been present fourteen years. This definite statement was, of course, important, for nothing would have been easier than to regard the neck tumor as a collection of supra-clavicular lymph-glands infected by the mammary cancer. The long duration of the tumor, the pain referred to the digits when it was pressed, and its mobility and uniformity, induced me to regard it as a neuroma connected with the fifth and sixth cervical nerves, implicating more particularly those strands which help to form the median nerve. This diagnosis was verified at the operation, for after amputating the mamma I exposed the tumor in the posterior triangle by a vertical incision, and saw a large nerve-trunk embedded in it : the capsule of the neuroma was then opened with a knife, and a tumor the size of a bantam's egg was readily enucleated by means of a raspatory. There was no bleeding from the capsule. After the removal of the tumor the conjoined trunks of the fifth and sixth cervical nerves were made out. As soon as the patient recovered consciousness I tested the movements of the thumb and fingers, and had the satisfaction of assuring myself that there was no paralysis nor evidence of anæsthesia in any part of the limb. In this instance, had I attempted to remove the tumor with its capsule I should have been obliged to perform a

very difficult dissection in an extremely dangerous region, and run the risk of irretrievably paralyzing important muscles of the forearm, of wounding some large venous or arterial trunks, or of opening the pleural cavity. By simply enucleating the tumor from its capsule, a proceeding which consumed only a very few minutes, I avoided all these risks, and the patient was convalescent in a few days.

A very important case was published in the *Medico-Chirurgical Transactions*, vol. lxi., in which Chavasse removed a neuroma as large as a duck's egg from the right posterior triangle of the neck. The dissection was difficult and deep. The patient, a woman thirty years of age, died six days after the operation, from spinal meningitis. At the post-mortem examination it was found that in removing the tumor the sixth cervical nerve had been torn off, the root giving way inside the dura mater. Pus from the wound had leaked into the canal, producing fatal meningitis.

My chief object in this lecture is to impress upon you the importance of remembering that all simple neuromata are encapsuled tumors, and that when the capsule is split they can be shelled out with the greatest ease and safety. When growing from the side of a nerve they may be removed with their capsules.

It is true that in some instances where surgeons have unconsciously divided large nerve-trunks they have sometimes been able to repair the breach in their continuity by nerve-suture or nerve-grafting. It is, however, always better to avoid the accident by careful surgery than to remedy it by secondary measures, however brilliant.

TUMOR OF THE CEREBELLUM, PROBABLY TUBERCULAR.

CLINICAL LECTURE DELIVERED AT ST. ANTHONY'S HOSPITAL.

BY HOWELL T. PERSHING, M.Sc., M.D.,

Professor of Nervous and Mental Diseases in the University of Denver; Neurologist to St. Luke's Hospital and St. Joseph's Hospital; Alienist to the Arapahoe County Hospital.

GENTLEMEN,—The patient is a well-built though somewhat emaciated man, aged twenty-eight, with no apparent hereditary taint. Twelve years ago a chronic cough set in, and for about a year he occasionally spat blood, but these symptoms gradually disappeared. Six years ago he worked for a short time with lead ores, without any apparent bad effects. Although he confesses to frequent attacks of gonorrhœa, there is no history of syphilis. He says that for three years, ending in March, 1893, he was drunk half the time; since then he has had no alcohol.

A year ago he began to have severe headaches, and at the same time noticed that he sometimes staggered in walking. For six months past, the headaches growing more intense, there have been attacks of giddiness, dimness of vision, and vomiting. Once, during July, he fell and was unconscious for some minutes.

For a short time this summer he was in the County Hospital, where, on account of some mental symptoms, he was transferred from the general ward to the care of Dr. Eskridge, who found, among other symptoms, optic neuritis and exaggerated knee-jerks. A few days ago, while I was examining his ears, he suddenly fell back with all his muscles rigid. His head was drawn back, the eyes opened widely and the pupils dilated, while respiration was somewhat quickened. In three or four minutes the tonic spasm had passed off and consciousness gradually returned.

He now complains of intolerable headaches, pains over the body generally (more especially in the left thigh), giddiness, frequent vomiting, failing sight, and occasional visions, which he recognizes as hallu-

cinations. The pulse is regular, and ranges from eighty to one hundred and twenty beats a minute. During his stay in this hospital his temperature, with one trifling exception, has been perfectly normal. There is no heart-disease. The urine is normal, although there is sometimes a little difficulty in passing it. At the apex of the right lung expiration is prolonged, harsh, and blowing, almost bronchial. Although his general strength is much depressed, there is no paralysis of the limbs, face, tongue, or ocular muscles. A slight paresis of the left arm with distinctly exaggerated tendon reflexes, which I detected a few weeks ago, is no longer apparent.

His gait is unsteady, often so much so that he seems about to fall. It is not the high-stepping, stamping gait, with double footfall, characteristic of advanced tabes, but rather the reeling walk of a drunken man. Neither walking nor standing is decidedly affected by closing the eyes. The patient feels as though he were going to fall to the left. Sometimes, when lying still, he is so giddy that he is afraid to stand or even sit up, for fear of falling. In these giddy spells his bed may seem to move with him, or the next bed may appear to be moving towards him. There is some incoördination of the movements of the arms; with eyes closed he cannot readily touch the tip of his nose with either hand, nor can he bring the tips of his index fingers together above his head.

Sensibility to pain, touch, and posture are perfect, or nearly so, throughout the body. Smell and taste are normal. Hearing is greatly impaired on both sides, so that it is necessary to speak to him in a very loud tone. He attributes his deafness to catarrh, but the tuning-fork shows that the defect is in the nerves or brain, a strongly vibrating tuning-fork held against the skull being scarcely heard in either ear. The deafness has rapidly increased during the past few months. The tympanic membranes show no sign of present or past suppuration. The right eye is blind from an injury received in childhood. Vision in the left eye is for a part of the time quite good, but objects are often obscured by an apparent cloud, which after a few moments clears away. These intervals of cloudiness are growing more frequent and last longer. There is no considerable limitation of the visual field in any direction. The ophthalmoscope shows intense optic neuritis on the left side. The right fundus cannot be seen.

The knee-jerks are entirely absent. They have been repeatedly tested, making sure that the flexor muscles are not contracted, and having the patient pull on his hands to re-enforce the jerk, but without eliciting any distinct response.

Mental symptoms are not conspicuous, although his deafness makes him appear dull when he really is not so. He answers intelligently, and his attention can be held during the examination. Nevertheless, his memory is slightly impaired for recent events. There is no trace of aphasia; he understands, speaks, reads, and writes apparently as well as ever.

Now, what disease do these symptoms suggest to you? One answers, locomotor ataxia; another, alcoholic neuritis; a third, tumor of the brain.

The loss of knee-jerk, and the unsteady gait, with the slight difficulty in micturition, certainly suggest *tabes dorsalis*; but we may dismiss the idea. There is no history of lancinating pains; the pupils are normal; the optic nerve is inflamed, not simply atrophied as in *tabes*; and, what is quite decisive, the knee-jerks were present and even exaggerated after the main features of the disease had fully developed.

Alcoholic multiple neuritis may in rare cases be accompanied by optic neuritis, but multiple neuritis reveals itself by both motor and sensory loss in the extremities, symptoms absent in this case. There is a rare form of inflammation of the brain, caused by alcohol, in which optic neuritis may occur; but, in the absence of palsy of any of the motor cranial nerves, with the mental condition fairly good, this form of alcoholism is excluded.

Now, as to the third suggestion. Intense headache, giddiness, vomiting, and mental aberration, however slight, must always cause a grave apprehension of intra-cranial tumor, and if to these symptoms optic neuritis be added, the diagnosis of tumor is well-nigh certain.

Optic neuritis and optic nerve atrophy are of such great significance that every physician ought to be able to use the ophthalmoscope. We cannot hope to equal the oculists in the niceties of ophthalmoscopic diagnosis, but we can all, without a great deal of trouble, learn to distinguish a normal nerve from one that is distinctly inflamed or atrophied. Learn to examine by the direct method, and if the pupil is small, use cocaine to dilate it. Do not use atropine: it usually paralyzes accommodation for a week or ten days, and in that time the neuritis or atrophy may advance so that good vision can never be restored; in such a case the patient ever afterwards blames the physician for destroying his sight. Cocaine has but little effect on vision, and that quickly passes off.

Optic neuritis is far more frequently caused by brain-tumor than by any other disease, hence it is the most decisive symptom of tumor. Still, it is not absolutely decisive, even in connection with the other

symptoms, until some other diseases besides the forms of alcoholism already discussed have been excluded.

Uræmia may, in rare cases, cause an optic neuritis just such as occurs in tumor, instead of the neuro-retinitis so characteristic of chronic nephritis. Now, as uræmia may also cause headache, vomiting, dullness, and perhaps convulsions, it is readily seen how easily disease of the kidneys might be mistaken for tumor of the brain. Such a possibility is not excluded by a failure to find albumin in the urine, for in interstitial nephritis albumin as well as casts may at times be absent. When, however, as is the case with this patient, there is no albumin, the quantity and specific gravity of the urine are not below the average, and there is an absence of the arterial and cardiac changes commonly associated with interstitial nephritis, then we may safely dismiss the idea of uræmia.

Lead-poisoning in its severest forms may involve the brain and cause optic neuritis, so as to be mistaken for tumor; but this cannot be the case with our patient, for he has not had even the milder symptoms of plumbism, such as dry colic or wrist-drop, and there is no lead-line on the gums.

Profound anæmia may also simulate tumor, but a glance at the patient shows that he is not profoundly anæmic.

Still, we are not able to rest securely in the diagnosis of tumor. Meningitis and intra-cranial abscess must yet be considered. Acute meningitis is excluded in this case by the slow development of the symptoms. Chronic meningitis is practically either alcoholic or syphilitic. Our patient does not have the tremor or delirium that is associated with alcoholic meningitis. Syphilitic meningitis alone could hardly cause the intense optic neuritis seen in this case, and, besides, the failure of large doses of mercury and iodide of potassium favorably to influence the disease is strongly against any idea that it may be syphilitic.

Abscess of the brain has many symptoms in common with tumor. But in abscess there is usually an ascertainable cause, such as suppuration in the ear or elsewhere; the pus is apt, though not at all certain, to betray itself in slight rigors and evening rise of temperature; the optic neuritis, if present at all, is rarely intense; the course of the disease, if chronic, is not steadily progressive, but a period of rapid development exceeds one of comparative latency. In the light of each of these distinctions our patient's symptoms indicate tumor rather than abscess.

After this rather tedious, but absolutely necessary, consideration

of other diseases, we may take it as only too well established that the patient suffers from a morbid growth within the skull, and it becomes of the utmost importance to know where it is and whether it can be successfully removed.

There is a striking absence of the more easily interpreted localizing symptoms. There is no tenderness of the skull on percussion, no localized spasm or paralysis, no hemianopsia, no aphasia. This makes it highly probable that the motor areas and occipital lobes on both sides, and the parietal lobe, first temporal convolution, and Broca's convolution on the left side, are not involved. The central ganglia, crura, pons, and medulla are also fairly excluded by the absence of paralysis, anæsthesia, and hemianopsia.

As between the latent regions of the cerebrum and the cerebellum, certain symptoms point positively to the cerebellum. A reeling gait is so associated with cerebellar disease that it has been called "cerebellar titubation." Moreover, the absence of knee-jerk, the prominence of giddiness and vomiting, the intensity of the optic neuritis, the rapidly-approaching blindness and deafness,—all are most readily accounted for by assuming a tumor of the cerebellum.

Absence of the knee-jerk in a case of brain-tumor is an important localizing symptom. In the great majority of cases of tumor of the cerebrum the knee-jerk is either exaggerated or it is unaffected; in a small proportion of cases it is diminished; very rarely indeed is it abolished.

In tumor of the cerebellum, on the other hand, while the knee-jerk is often increased, its total abolition is quite common. It follows, then, that from absence of the knee-jerk we may infer that the tumor is in the cerebellum or presses upon it.

The deafness of this patient, which we have seen to be nervous, not catarrhal, also points towards the cerebellum. It cannot be accounted for by pressure on the auditory nerves, because a growth could not select both of these nerves for destruction and leave the facial nerves and other important structures unaffected. Now, while the course of each auditory tract from the auditory nuclei at the junction of the medulla and pons is not definitely known, it is very probable that Gowers is right in supposing it to pass nearly directly upward in the most superficial layer of the tegmentum,—that is, just beneath the aqueduct of Sylvius. If this be so, or if, as the researches of Monakow and of Spitzka tend to prove, the posterior tubercles of the corpora quadrigemina have the same relation to hearing that the anterior ones have to sight, it is easy to see how a growth of the middle cerebellar lobe, pressing forward,

could cause bilateral deafness. The blindness is in all probability due, in part at least, to such pressure on the region of the anterior tubercles.¹

This explanation implies that the growth is in the middle cerebellar lobe, which is in harmony with other localizing symptoms. Cerebellar titubation does not occur unless the middle lobe is affected; if it does not appear until late in the course of the disease, the tumor has probably begun in one of the hemispheres and afterwards encroached upon the middle lobe; but if, as in this case, staggering is one of the earliest symptoms, the tumor was probably in or near the middle lobe from the start.² The tendency to fall to the left is an indication that the lesion is to the right rather than to the left of the median line; but this is not conclusive. Starr found that in twenty cases of cerebellar disease the patient staggered away from the side of the lesion in sixteen and towards it in four. The weakness and exaggerated tendon reflexes of the left arm, though transient, are also indications that the lesion is on the right side.

Now, what can be said as to the nature of the tumor? Syphilis must first be considered, for gumma probably occurs more frequently than any other form of intra-cranial growth. Here we not only have no history of syphilis, which counts for little, but both mercury and potassium iodide have been thoroughly tried, the dose of the latter reaching two hundred and seventy grains daily, without the slightest apparent benefit. The local diagnosis is strongly against syphilis, for, while gumma in the cerebrum is common, in the cerebellum it is very rare; of twenty-two fatal cases of intra-cranial gumma, recorded by Starr, in not one was the growth found in the cerebellum.

The history of cough with hæmoptysis, confirmed by physical signs still present, naturally suggests that the tumor is tubercular; and the local diagnosis favors this view, for the cerebellum is a favorite seat of tubercular growths. Carcinoma at this man's age, in the absence of a known source of secondary infection, is practically out of the question. While there is nothing to exclude glioma or sarcoma, there is nothing indicating the presence of either, so it is fair to presume that we have to deal with a tubercular growth.

We are now ready to consider what can be done for the patient. A tubercular tumor can never be removed by medicines, and only in the rarest of rare cases can tonics and full feeding even arrest its growth.

¹ Dercum, *Journal of Mental and Nervous Diseases*, October, 1893.

² Starr, *Brain Surgery*, 1893, p. 239.

Still, with this slender hope, the antisyphilitic treatment has been displaced by tonic and supporting measures, apparently with some advantage. Occasional free watery purgation relieves the headache somewhat, and by the use of antineuralgics and morphine much of the otherwise inevitable suffering is avoided. In such a case it would be cruel to withhold morphine on account of the danger of the morphine habit or on account of the slightly increased danger of a rapidly fatal termination.

But before we resign ourselves to a merely palliative treatment we must earnestly consider whether it is possible to cure by surgical means. Of all intra-cranial tumors, about one in twenty is so situated and of such a nature that its complete removal and the subsequent restoration of the patient to health are possible. The cerebellum is a very unfavorable region for operation. A growth in it can be reached only through the inferior surface, and it is not known how much damage the organ can sustain and the patient live. All manipulations in this region are exceedingly dangerous, on account of the close proximity of the pneumogastric nerves and of the vital centres in the pons and medulla. Starr tabulates sixteen cases of operation for cerebellar tumor: in nine the tumor was not found; in two it was found, but could not be removed; in three it was removed, but the patient died; in two cases the tumor was removed and the patient recovered, at least for a time. Now, if our patient had one chance in eight of a successful removal of the tumor, there could be no question of the propriety of operation; but he has no such chance. The staggering and deafness indicate that the middle lobe is involved, probably in its anterior part: so we have the most unfavorable situation for an operation. Moreover, a tubercular tumor is a very unfavorable kind for removal, on account of the danger of there being more than one growth, and of the difficulty of removing completely even a single one. Von Bergmann rather advises against attempting to remove tubercular tumors of the brain in any situation; and, while in this he is probably over-cautious, there can be no doubt that the successful removal of a tubercular tumor from the middle and anterior part of the cerebellum is entirely beyond any reasonable hope.

We must be content, then, merely to palliate this patient's suffering, while waiting for death to end it. Nevertheless, this minute study of his case has not been useless, for the application of the same principles to the next case of intra-cranial tumor may lead to a cure by means of mercury and potassium iodide, or perhaps to a successful operation.

CEREBRAL MENINGITIS; LEAD-POISONING; ALCOHOLISM.

CLINICAL LECTURE DELIVERED AT THE COOK COUNTY HOSPITAL, CHICAGO.

BY DANIEL R. BROWER, M.D.,

Professor of Mental Diseases, Materia Medica, and Therapeutics, Rush Medical College; Professor of Diseases of the Nervous System, Woman's Medical College; Professor of Diseases of the Nervous System, Post-Graduate School; etc.

LADIES AND GENTLEMEN,—Those of the class who saw the infant with tubercular meningitis will recognize the decubitus of this patient as the same. You notice the head is thrown backward. This has been the position of the patient ever since he came into the hospital. We can always get a great deal of information by simple observation. I am inclined to think the older practitioners in medicine, in having to rely more upon it, were better observers than we of to-day, with our many instrumental aids to rapid and accurate diagnosis. While these aids are very valuable, we are apt to place too much dependence upon them. Learn to study that which may be seen without the use of any but the ordinary means of observation you all possess. The physiognomy of the patient, the position in bed, the number and rhythm of the respirations, and the many other important points accessible to the eye should not be ignored for the more accurate and invaluable evidence furnished by the thermometer, the stethoscope, the aspirator, and the instruments of percussion.

History.—Patient admitted to hospital, February 23; no previous history, except that he had been sick for a week before admission; was delirious; complained of intense pain in the head and along the spine in the cervical region. Examination of the heart, abdomen, and lungs negative; pupils dilated; bowels constipated.

Mark the three symptoms which in this case are especially worthy of your attention,—headache, vomiting, and constipation. These are the three leading symptoms of meningitis. The pain in the head was excruciating. When I saw this man last Monday, the 22d, he had

his hands to his head and was tossing back and forth in bed incessantly. This is the pain of meningitis; and with it he had vomiting, constipation, and delirium. To-day, the 26th, he is very quiet, and just what this quietude means is not so certain. These cases of meningitis may very often deceive us. We shall find our patient delirious, restless, full of pains, hyperæsthetic, as this man was the other day; when touched almost anywhere, he showed evidence of pain. To-day he is sleeping and seemingly quiet. The only thing peculiar about the sleep is that his eyes are not closed. When we raise the lid, we find the pupil not far from the normal condition, neither especially contracted nor dilated. This quietude may be the result of his treatment. He has been taking potassium bromide and deodorized tincture of opium, supplemented by hypodermic injections of morphine. The indications for treatment during the first stage of meningitis are to quiet the patient,—to calm the nervous system; for this purpose we give the bromides and opium in some form. The movements and feelings of the patient should guide their use. I think these remedies should be given in sufficient doses to produce quietude. This condition which we find to-day may be the result of the treatment, and I hope it is, but we are often deceived in such a case. At one visit the patient may be found in a state of delirium; at the next he may be perfectly quiet, as this man is. Such quietude often means the passage from irritation to a state of pressure, when congestion gives place to exudation. Is this the coming on of the second stage of meningitis, or not? Has the intense congestion that has been prevailing in this patient's brain for so many days at length resulted in exudation? I am free to confess I do not at present know; to-morrow, probably, I shall be able to tell. The other day the pulse was strong and bounding, now it is soft and easily compressible. Then it required considerable pressure to obliterate it, now it takes but little. This may mean improvement of the patient, or it may indicate a more serious condition in the increase of pressure. The patient having reached this quiet stage, hypnotics and analgesics, no longer indicated, should give place to those remedies adapted to promote absorption. The patient has had an ice-cap on his head from the time of entrance, and counter-irritation along the spine. The former, having fulfilled its purpose, should be removed, and the sedative remedies should be gradually withdrawn, to be replaced by the iodides, preferably potassium iodide, in alterative doses.

These cases of meningitis are always very serious, and the promise of recovery is doubtful; many of them get up from their beds and go about their business, but retain as a legacy some intracranial disturb-

ance in the way of headaches, or in the shape of paresis. It is a most remarkable thing for one of these patients to make a full and complete recovery, and the prognosis as to recovery of any sort in meningitis is bad. It would be interesting to find out what is the cause of this disease. In the case of the little child you saw the other day, I expressed the opinion, which the post-mortem verified, that it was tubercular meningitis. Is this case one of tubercular meningitis? I think not, because of the suddenness of its onset and the violence of its symptoms. Furthermore, tubercular meningitis is not likely to occur at this time of life, this man being thirty years of age. What, then, is the cause? The man comes into the hospital without any history at all. We do not know whether or not he received an injury to the head, giving rise to an inflammation of the dura mater, making it in that case a pachymeningitis. There is no evidence of suppuration of the ear, nor is there any suppurative inflammation about the nose or eyes, which might lead one to suppose that it came from these not uncommon sources of meningitis. The affection comes on very often simply from exposure to cold; it is sometimes the result of an excessive use of alcohol, and sometimes the result of overwork; too much brain-work produces congestion of the organ, and meningitis is but a step farther in the same pathological direction. Syphilis is another cause. But what produced this man's disease we do not know; it is a case of simple non-tubercular meningitis. It looks like an example of the ordinary type, where the inflammation usually begins in the pia mater, but soon extends to the arachnoid, to the dura mater, and to the brain itself. When a case has progressed as far as this one has, you may reasonably suppose that the three membranes enveloping the brain participate in the inflammatory process, as does the brain itself, and at this stage you can safely call it meningo-encephalitis,—inflammation of both meninges and brain.

CASE II.—We have here another interesting but not an uncommon case of nervous trouble. This is one of the great class of neuroses.

History.—Family history, none. Patient, a man forty years old; drinks, and uses tobacco; was admitted to the hospital seven or eight months ago for the same trouble. Present affection began three weeks ago. Patient is well nourished, has a bluish line along the margin of the gums, and sordes in the mouth, has pain and slight tenderness over the abdomen, complains of weakness in the lower limbs, and is unable to extend the hands.

This man has been a painter for twenty years, and for nineteen years

he had no disturbance of the nervous system ; then he was seized with this colic, and shortly afterwards there came on the wrist-drop, from paralysis of the extensor muscles of the wrist. You see he has not yet recovered the use of these muscles.

Lead gets into the system by several methods : I think its entrance is accounted for in the case of painters by their own carelessness. They get their hands all smeared over with the lead, and then are not careful enough in cleansing them before they eat ; consequently, a good bit of the metal, doubtless, gets into the system by the stomach. Of course these men are continually exposed to minute particles of lead floating about in the atmosphere of the paint-shops and rooms where they are at work. Slight wounds, as bruises or cuts upon the hands, also afford entrance to the subcutaneous tissues, and, finally, to the general circulation. But I think the great majority of painters get lead into their system with their food. Some of these cases of lead-poisoning will be very perplexing to you. I remember being sent for, a few years ago, to see a gentleman of this city, a gentleman of leisure, with nothing to bring him in contact, in any ordinary way, with lead. He had painter's colic and wrist-drop, and for some time that case was a riddle to me. Finally, upon one occasion I got a good look at his hair, which gave me a clue to the mystery. He dyed his hair with a preparation of lead, and in that way had become poisoned. I have seen several ladies who were thus affected from the use of cosmetics. Some of the cosmetics that are most enduring, and do not come off with ordinary perspiration, consist largely of lead, and now and then you will find, among your fashionable female patients, cases of lead colic and wrist-drop which owe their origin to these preparations.

The chief indication in the treatment of lead-poisoning is to promote elimination. The lead is very largely excreted by the kidneys and bowels, and by the skin to a slight extent. Elimination is promoted in these cases by the administration of Epsom salt, or some equally efficient saline laxative ; magnesium bisulphate is esteemed one of the best of this class. In addition, potassium iodide is the one remedy indicated *par excellence*. The metal is taken up and carried out of the system by the influence of the iodide upon the absorbents. You can often verify your diagnosis by examining the urine. There is only one precaution to use in these cases of chronic lead-poisoning. Do not attempt too rapid elimination. I have once or twice seen bad results follow in the way of cerebral disturbance, intense pain in the head, and some delirium, from a too rapid letting loose of the lead in the system. If you give potassium iodide too freely, and endeavor too

quickly to dispose of it, the lead is set free from its lodgement, wherever that may be, more rapidly than it can be excreted, and so, accumulating in the circulation, it may become a source of irritation to the brain or spinal cord. If it is deposited in the peripheral nerves, of course it does harm ; if it is taken up by the liver, it does harm, but the injury is not so serious as that by its lodgement in the brain or spinal cord. You must be cautious, therefore, in these cases, not to give potassium iodide too rapidly. It should be administered in four- or five-grain doses, three times a day, accompanied by sufficient saline laxative to keep the bowels open. The next indication is to relieve the intense pains that the patient suffers, and, of course, the only reliable pain-relieving remedy is morphine. The great objection to morphine is that it interferes with elimination : it must be used, therefore, in the smallest possible amount. Some of the new remedies—for instance, antipyrine—are well worth your consideration in relieving the pain of painter's colic. In addition to the work of elimination, this man needs something to improve the tone of these extensor muscles, and the best agent for this purpose is the galvanic current. I doubt if you would get any response from faradism. The doctor who has attended him says he has given him hypodermic injections of strychnine. That is capital treatment for this paralysis. Faradism was used when he was in the hospital before, and if that will make the muscles respond, it is the most convenient method. If not, then the galvanic current should be applied in strength sufficient to produce extension. There should be daily use of that form of electricity which will produce muscular contraction, and the daily administration of strychnine, hypodermically or by the mouth. There is loss of power in the extensors and in the hand : his grasp is feeble, not more than half what such a man ought to have who has been a laboring man all his life.

CASE III.—Our third patient belongs to the same great class of neuroses, and yet at first sight would seem to have nothing whatever in common with this other patient. You see in this case there is a disturbance of the cerebrum. You notice the way in which she stares around the room ; that of itself shows some disturbance of the brain. You notice also the tremor in her hands.

History.—Patient, aged forty-two, admitted to the hospital February 26. Had been indulging in alcoholic stimulants freely of late ; was wildly delirious ; saw animals ; had to be restrained. She was given bromides. The doctor says she had delirium and visual hallucinations ; that she saw objects. And so they do : they see snakes and other things on the wall, moving about in every conceivable way.

The visual hallucinations and the tremor are the typical symptoms of this form of delirium, the alcoholic delirium, or delirium tremens. This condition is probably brought about by a combination of circumstances. These patients drink until the brain becomes saturated with alcohol, and that is one way in which its functions are disturbed, by the circulation of the alcohol itself in the brain ; then again alcohol produces vaso-motor paresis, which brings about congestion of the brain. We consequently have two causes operating to produce this delirium,—the presence of alcohol in the brain, and the congestion of the brain. These patients always have, as this one has, very great flushing of the face, and usually their eyes are very much injected : I think there is probably a similar condition of the brain, but even more intense than that shown in the face. This patient has a very dry tongue, and is suffering from profound prostration ; she is very ill, and we will let them take her back to the ward, and continue the subject with another case.

CASE IV.—Here is a young man who has just recovered from this same condition. There is some slight tremor here, although not so much as there was a few days ago ; there is also some paralysis.

History.—Patient had been drinking hard for some time previous to his admission to the hospital ; was delirious when admitted. Physical examination negative. Soon after admission he became wildly delirious ; had hallucinations and had to be restrained ; was very sick for five or six days.

The hallucinations peculiar to alcohol are visual ; they are not auditory nor of any special sense except the sense of sight. This young man has recovered from that delirious condition, but is still feeble, and has some tremor remaining, together with some paralysis of the extensor muscles. His tongue looks pretty well, and his general condition is improving. He says he did not have this drop of the hand before the last attack of delirium tremens, and it may be that as his brain entirely recovers from the storm through which it has passed, this will disappear. Alcohol plays havoc not only with the brain, but with the nutrition of the spinal cord and with the peripheral nervous system. Whether or not this paresis is due to degeneration of the spinal cord remains to be seen : it does not seem to be due to any peripheral disturbance, and it may be that it is due simply to want of restoration of the functions of the spinal cord. It may not be due to any degeneration ; but alcoholism produces all forms of inflammation of the spinal cord, and sets up inflammation of the brain itself and of the membranes that surround the brain ; it also produces inflammation

of the nerves. In some of these cases of alcoholism, where the man has been drinking for a number of years, the attack is brought about by the sudden withdrawal of alcohol ; in other cases drinking is continued until the stomach refuses the alcohol and everything else, and the result is exhaustion from lack of food and much vomiting, naturally culminating in delirium.

The first indication in treatment is to afford proper restraint. The subjects of acute alcoholism are as violent as can be : seeing all sorts of horrible things, they very naturally seek to escape from them, and in that way spend their energy very unnecessarily. Such cases should be put into a strait-jacket, and tied to the bed if necessary. They should be kept as still as possible, this being, I believe, the most successful part of the treatment. They must be fed : the stomach will reject all ordinary kinds of food, but beef-tea, with a pretty strong allowance of capsicum, makes a good mixture ; these people like fiery things, and red pepper and beef-tea make a very good combination. Give them small quantities of food at regular intervals : they need an abundance of nourishment, and as the stomach gradually improves it must be increased in quantity. To reduce the delirium they must have some sort of sedative. I believe a mistake is often made in giving sedatives to these patients. Some people think that they must be forced to sleep ; that is a mistake ; I think the amount of narcotic that would be necessary to put a patient with delirium tremens to sleep is a dangerous dose, and I have no doubt some of the sudden deaths from delirium tremens are due to the efforts of the attendants to produce sleep. I don't think it is a very serious matter if they do not sleep for the first twenty-four hours. They should have moderate doses of potassium bromide and chloral hydrate, but in all cases you should guard against heart-failure, which is liable to occur : use a tonic, such as strychnine or digitalis, or tincture of hyoscyamus. My favorite drug is strychnine along with moderate doses of potassium bromide and chloral hydrate. Watch carefully the circulation, and see to it that you do not too much depress the heart's action by the use of such drugs as chloral and potassium bromide. I think in all these cases of delirium tremens where the condition is one of great prostration, where the patient has been drinking for a long time, it is not wise to attempt their treatment without small doses of alcohol. One cause of death in these cases is the stopping abruptly the use of alcoholic stimulants, and it has always been my practice, if there is much prostration, to give small doses of alcohol. I think that strychnine, the bromides, chloral, and alcohol are the remedies to use, with the precautions I have given. And then

when the acute delirium passes and they get into the condition this patient is in, they no longer need the bromides and chloral, but must have tonics. At St. Joseph's Hospital, in this city, where we treat a great many of these cases, we use a combination of tincture of capsicum, nux vomica, and compound tincture of cinchona; it contains one to two minims of the tincture of nux vomica, four to five minims of capsicum, and enough tincture of cinchona to make a drachm, and the patient is given a dose every three to four hours, according to the amount of prostration shown. And with that we increase the food: instead of giving them beef-tea and capsicum, we give them milk and, after a little while, the ordinary diet that such people are accustomed to have.

CASE V.—You notice in this case great wasting of the muscles, marked atrophy of the hands, some atrophy of the forearm, and some atrophy of the arm. This patient is a laboring man; he had about a year ago a swelling of the arm, followed by loss of power. There is, in addition to this wasting of the muscles, tenderness over the nerve-trunks, especially in the arm, and over the ulnar and radial nerves. You observe the atrophy, the muscular tenderness, and the history of pain and swelling. This patient tells me he has been in the habit of drinking a great deal for about eight years. The condition of the hands is due either to a peripheral disease or to a disease of the spinal cord; it is one of the forms of inflammation of the anterior horns, or it is due to peripheral disease. It does not look unlike a case of progressive muscular atrophy; the wasting of the muscles and the parietic condition of the hands are very suggestive of chronic anterior poliomyelitis; but the amount of pain he claims to have had, the disturbance of nutrition in the way of swelling in the arm, and the tenderness over the nerve-trunks point to some other cause for this wasting of the limb and its want of power. I therefore regard this as a case of neuritis, or inflammation of the nerve-trunks. He has this atrophy in both arms, so it is a case of multiple neuritis; and as almost all cases of multiple neuritis are of alcoholic origin, this one is probably no exception to the rule. Multiple neuritis does not usually confine itself to the upper extremities, but tends to progress along the important nerve-trunks of the body, sooner or later involving both the extremities. From the patient's stand-point, the chief difference between this condition and inflammation of the anterior horns is as regards prognosis; the victim of progressive muscular atrophy has an outlook that is positively bad, while the subject of multiple neuritis has a more favorable prospect.

The internal treatment should consist in the employment of mild alteratives and tonics : small doses of potassium iodide and mercury, together with strychnine and some preparation of phosphorus, are therefore indicated. Of prime importance, however, is the application of counter-irritation over the affected nerve-trunks. I think it advisable to paint the part with the tincture of iodine, and would get up as much irritation, superficially, as can be conveniently borne by the patient. After the more acute symptoms subside, electricity should be applied to the muscles, to prevent their becoming atrophied, and to help the injured nerves regain their suspended function. I do not suppose there would be any response to the faradic current ; but if the interrupted galvanic current will produce a response, it will be of benefit to the patient when used in strength just sufficient to produce contraction of the muscles.

CASE VI.—The case I now bring before you is one of left-sided hemiplegia. There has not been at any time disturbance of this patient's speech. You remember the cases of right-sided hemiplegia exhibited last week were all more or less aphasic, some of them completely so : in some the function of the speech centre had been somewhat restored. This centre, it may be remembered, is located on the left side of the brain, together with the other centres governing the right side of the body ; hence, in right-sided paralysis, where communication between the left side of the brain and the right side of the body is more or less completely cut off, some impairment of speech usually accompanies the other impaired functions of the right side. In these cases the lesion is upon the right side of the brain, consequently there is no interference with speech.

History.—This patient was admitted to the hospital on February 22. He has been a hard drinker for many years ; had syphilis two years ago. Recently he had been sick about a week ; was delirious, and had been treated for typhoid fever, no paralysis having been noticed. On his admission to the hospital, physical examination revealed partial anæsthesia of the left side, paresis of the left side of the face, almost complete motor paralysis of the left arm, and not quite as complete paralysis of the lower extremities. Two days after his entrance he had a convulsion lasting several minutes ; next day, the 25th, he had a second, with the right arm and both legs in a state of chronic contraction ; this lasted several minutes. Since then he has had two similar attacks.

When I first saw this patient in the ward he had that very interesting and important accompaniment of hemiplegia, conjunctival deviation of the head and eyes. This is not a common symptom of the disease,

but when present it is a valuable aid to diagnosis. This man's eyes were turned to the extreme right, away from the paralyzed side, his head being rotated in the same direction ; and any effort to move his head seemed to be painful to him even in his semi-comatose condition. The right side was in constant motion, a feature which made it less difficult to locate the paralysis. From the history we conclude that this, in all probability, is a case dependent upon cerebral hemorrhage secondary to syphilitic degeneration of the blood-vessels. I say "probably," because I do not think we should make a very positive diagnosis.

Pediatrics.

TETANUS NEONATORUM; BASILAR MENINGITIS, ETIOLOGY AND TREATMENT.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL.

BY HENRY DWIGHT CHAPIN, M.D.,

Professor of the Diseases of Children at the New York Post-Graduate Medical
School and Hospital; Attending Physician to Demilt Dispensary,
New York City, New York.

GENTLEMEN,—On January 1 there was admitted to the babies' wards of the hospital an infant suffering from tetanus neonatorum, who died about four hours after admission. I was enabled to exhibit the child to a few before its death, and I will now give a more detailed history of this instructive case.

Simon F—, ten days old, was born healthy, weighing nine pounds. The mother had been deserted by her husband, and was in poor circumstances. She seems to have been fairly healthy, and has never had any miscarriages, this being the first and only child. The condition at birth was normal. The first disturbance that was noted was on the sixth day, when the infant turned its head to one side as if in a slight spasm. This grew somewhat worse, and on the eighth day the child had clonic convulsions, which passed off in a few hours. There has been no history of vomiting. On the ninth day the infant refused the breast, and, as the mother was in a bad condition, it was brought to the hospital.

An examination showed the infant to be in a condition of poor nutrition; it seemed to be suffering from a general tonic spasm, the arms and legs were flexed and rigid, the fingers tightly clinched, the head thrown back, and the jaws somewhat rigid. Opisthotonos was fairly well marked; the infant could be raised with one hand under the head and the other under the legs, while it remained as stiff as a poker. During the few hours of life it had exacerbations of this condition; at times, however, there was considerable relaxation; the

pupils were contracted and reacted to light. An examination of the lungs gave a negative result. The child swallowed with much difficulty, although it managed to take part of a bottle of sterilized milk and lime-water. There was frothing at the mouth when the spasms increased in severity. An examination of the head showed that the occipital bone was much depressed, the parietal bones overriding upon both sides. This was reduced without any difficulty, but the reduction made no difference in the condition of the spasm. A rather untidy dressing was removed from the umbilicus, and the stump was seen to be suppurating and in an unhealthy condition. Swallowing grew more and more difficult, and the infant soon died of exhaustion.

Much trouble was encountered in procuring an autopsy. However, I refused a certificate, and finally, after a week's delay, secured the privilege of examining the body. During this interval it was packed in ice and frozen stiff. An examination showed no disease or lesion of the central nervous system, the brain and cord both being studied. The inflammation in the umbilicus could be recognized, and a phlebitis extended about half an inch back of the stump. There was no evidence, however, of peritonitis or pleurisy. The intestines were decomposed, and presented nothing worthy of note. It was evident that the cause of the tetanus was infection derived from the umbilicus.

It has long been recognized as a fact that although this disease is distributed through a very wide geographical area it is nearly always found in filthy surroundings. Among the negroes in the South it is exceedingly common, also in India and the West Indies, and in parts of Iceland. One of the physicians in the class, who has been practising in China, tells me it is exceedingly common among the poorest classes there. He mentioned one family in which four infants died of this fearful malady. The beginning of the affection is seen in most cases after the navel-string has separated. We are indebted for a better understanding of this disease to bacteriology. Something besides filth is necessary; there must be a specific cause. As early as 1884, Nicolaier observed that tetanus could be produced in guinea-pigs and rabbits by injecting various particles of earth. This earth contained a bacillus which, although not then separated, produced by its cultures the same disease. This bacillus was afterwards described as being of the pin-head and bristle-shaped form. It may exist in straw or dust from hay, which explains the fact that horses are subject to this disease, and that traumatic tetanus is often seen among laborers who are employed about farms and stables. Guelpe, in 1889, published a

most complete monograph upon this disease. He arrived at the following conclusions: "(1) Tetanus is an infectious disease; traumatic tetanus in the true sense of the word does not exist. (2) Although the horse is one of the animals most apt to contract this disease, tetanus is not of equine origin. It would be more correct to attribute it to a telluric origin, but this would be too restricted. We believe it preferable to affirm simply that it is of microbic origin. (3) The symptoms of tetanus are not the direct effects of the microbes, but occur in consequence of the toxic substances generated by them. (4) During the first manifestations of tetanus, at least, the multiplication of the microbe is limited to the seat of infection; it is only later, and quite rarely, that the bacillus becomes generally diffused through the organism. (5) Although opposing the nervous theory of tetanus, we must admit that the nervous system possesses an excessive susceptibility altogether peculiar to the action of the micro-organisms or products generated by them."

While the bacillus of tetanus does not necessarily exist in any one place, the umbilical sore is undoubtedly the source of its entrance in the vast majority of cases of tetanus neonatorum: hence the utmost cleanliness must be observed in cutting the cord and in dressing it. Dirty scissors are often employed, or string that has not been in a clean place. Scissors can be rendered antiseptic by drawing them through the flame of a spirit-lamp. The excess of the gelatinous matter may be stripped off the cord, and a dry antiseptic dressing applied. Speedy mummification of the stump will be the best safeguard against the entrance of microbes. There may be no evidences, however, of marked inflammation at the umbilicus.

Special care must be exercised in the umbilical dressings when the infant's parents work in stables, or where the dwelling is easy of access to stable-yards containing horse-manure or loose earth.

It is interesting, in connection with the case here cited, to observe the condition of the occipital bone. The late Dr. J. Marion Sims considered depression of the occipital bone to be the most common cause of tetanus neonatorum, and thought that relief could be frequently procured by putting the infant upon the face, and thus removing pressure from the back of the head. In this case the occipital bone was markedly depressed, but it was immediately reduced, and the reduction resulted in no change in the symptoms.

Prophylactic treatment is the most satisfactory. When the disease has become thoroughly established it is almost invariably fatal; however, means should be taken to discover, if possible, the seat of infection.

In cases of suppuration about the umbilicus, frequent washings with a solution of mercuric bichloride of suitable strength should be employed. Guelpe states that the bacillus exists to a great extent in the deeper portions of the wound, and hence curetting or free incision may be employed. This could hardly be done in the case of the umbilicus. Free antiseptic washing, however, is certainly indicated. With reference to drugs, the two most valuable are potassium bromide, in large doses, and chloral hydrate. At the same time these are administered, the infant must be given nourishment frequently, and stimulants freely employed. The difficulty of swallowing, however, handicaps us in satisfactorily carrying out these measures.

The next case I shall present to you is an infant, thirteen months old, who was admitted to the babies' wards December 29, 1890. His mother has always been healthy, has had no miscarriages, and has two other children, aged three and seven years respectively, and both are healthy. This infant was on the breast for a year. Dentition began two months ago, when the two lower incisors were cut. The infant seems to have been perfectly healthy until six weeks ago, when the present trouble began. The child then fell from a sofa, striking the back of the head. The parents are Polish Jews and very stupid, and it is difficult to obtain an accurate history from this time, but one week afterwards the infant was seized with convulsions, each lasting several hours. It had two attacks of these convulsions daily for about two weeks. A few days ago he apparently lost his sight, and the bowels were costive, acting only by injections. The infant is very dull and stupid, sleeps most of the time, vomits, and has some cough; the pupils are dilated and do not react to light, and there is internal strabismus in both eyes. An ophthalmoscopic examination has shown the fundus of the eye to be healthy. The reflexes are somewhat exaggerated. The child's weight on admission was nineteen pounds two ounces; temperature, 99°; respiration, 24; pulse, 118.

Since admission it has been unconscious all the time, lying with the head thrown back in the position in which you see it. It seldom cries except when disturbed; the limbs are held in the flexed position, but are not stiff. Examination of the lungs is negative. The pulse is irregular at times. On the second day of its stay in the hospital its temperature went up to 100°, but since then it has remained between 98° and 99°. The pulse has varied from 110 to 130, and is becoming more rapid and irregular. The respirations have ranged from 22 to 36. The skin is somewhat hyperæmic and apparently hyperæsthetic, as the infant will cry if handled much. Both sight and hearing are largely

in abeyance, although the perception of light is not entirely lost. The bowels were at first quite costive, and an enema was given soon after the infant entered the hospital. In a day or so they began to act more freely, and finally a condition of diarrhœa ensued, which has proved difficult to check. For two days the infant had six stools in the twenty-four hours, and yesterday eight stools, and to-day blood has been noticed in the discharges. This diarrhœa has come on in spite of careful feeding, the infant being given nothing but sterilized milk, and in the last few days large doses of bismuth subnitrate have been administered. To-day I have tried to control these discharges by injections of bismuth and starch-water. I regard this sanguineous diarrhœa which does not yield readily to treatment as a grave symptom in the case.

We evidently have here a case of basilar meningitis in which the prognosis is bad. The unfavorable prognosis may be based upon the fact that the pulse is becoming more irregular, and it is a clinical fact that few cases of meningitis of any kind go on to recovery when the functions of the brain are seriously impaired and the cranial nerves and special senses severely crippled.

The question naturally arises as to the cause of the meningitis in this case, and the relation of the fall to the symptoms. Marked cerebral symptoms do not seem to have come on until a week after the accident, but it is well known that meningitis is very insidious in its early manifestations. The active cerebral symptoms are nearly always preceded by very great fretfulness and restlessness, with intolerance of light and more or less headache. Doubtless a careful observation would have established these symptoms in the week that elapsed before the occurrence of the convulsions.

I believe we can broadly distinguish two leading varieties of meningitis, septic and tubercular. The constitutional disease, cerebro-spinal meningitis, is not here considered. Septic meningitis is produced by pyogenic microbes. These microbes commonly gain entrance through the nose or ears. There may be otitis media, with or without caries of the petrous portion of the temporal bone; or there may be suppurating foci in the nose which communicate with the brain through the cribriform plate of the ethmoid. We may likewise have abscesses or tumors in the brain, and occasionally extension of inflammation from some of the structures in the orbit. Doubtless in not a few cases injury acts by producing a fracture somewhere at the base, and thereby affords entrance for the germs. But septic processes in distant parts of the system may occasionally be responsible for meningitis, as the microbes enter the circulation and are thus carried to the meninges.

In this case there does not appear to have been any discharge from the nose or ears, but still, in some way unknown at present, septic germs have gained entrance to the meningeal surfaces, with the production of inflammation.

In addition to sepsis, the second cause is found in the tubercle-bacilli. Tubercular meningitis, however, runs a more subacute course : while the septic meningitis terminates usually before the twentieth day, tubercular inflammation may run for several weeks, or even much longer, presenting exacerbations and remissions. There is often in these cases a history of phthisis in the family ; heredity is therefore an important aid to the diagnosis. There is also a history of previous ill health in the child, as well as lymphatic enlargements and other evidences of struma. In fact, the distinction between septic and tubercular meningitis must rest principally upon a careful study of the previous history of the cases and the mode of onset, this being much more gradual and insidious in the latter variety. In well-developed meningitis, where, as already noted, the functions of the brain and special nerves are seriously crippled, the prognosis is about equally bad in both varieties.

The hopeful time for the treatment of meningitis is the prodromal period. By giving a mild mercurial laxative, applying cold cloths to the head, and administering large doses of potassium bromide, you may succeed in some cases in controlling the beginning of the inflammation. At the same time a very careful search must be made for the source of entrance of any septic germs, and to this end the nose and ears must be subjected to careful scrutiny and, if possible, a thorough antiseptic cleansing. The distant organs of the body must also be examined to find a possible source for the microbes that are beginning to affect the meningeal surfaces.

Surgery.

POTT'S DISEASE.

CLINICAL LECTURE DELIVERED AT THE BELLEVUE HOSPITAL.

BY LEWIS A. SAYRE, M.D.,

Professor of Orthopædic Surgery in the Bellevue Hospital Medical College, New York.

GENTLEMEN,—Two days ago this little child was brought to me from one of the extreme Southern States for the purpose of having a diagnosis made. She had been seen by a number of eminent physicians in the South, and for some months there had been much difficulty experienced in making the diagnosis. The parents have very kindly consented to bring the child here before you to-day in order that you may profit by seeing the case. Whether the long journey from the South has developed the disease still more, or not, I cannot say, but when I first saw the child the diseased condition was quite evident. The child is twenty-one months old, and was perfectly healthy and active up to last May, when she first complained of stomach-ache. Please bear this symptom in mind. She was eating irregularly at the time, and the physician who saw her then thought her trouble was entirely due to indigestion. But attention to the diet did not relieve the stomach-ache. In July another physician saw her, and an examination of the child's body at that time showed a "knuckle" on the back, and consequently a diagnosis was made of spinal disease. At that time she could pick up objects from the floor very naturally, and could move around very actively without complaining of pain in the back. She has never complained of pain in the back, but only of pain in the stomach. This is the rule: stomach-ache, not back-ache. Another physician was called in after the diagnosis of spinal disease was made, but the physicians, I am told, were not positive of their diagnosis, on account of the negative character of some of the tests employed, and because there was no pain in the back. After a while she began to lie around on the floor and to move less actively, and she then complained of feeling "tired." While the family physician

believed there was spinal disease, he was not sufficiently sure of it to feel justified in putting on a plaster jacket. It is amusing to note that the parents observed that the child walked peculiarly, but they thought she was imitating the peculiar gait of their old fat cook.

Now, watch the way in which this child stoops to pick up an object from the floor; see how she shrugs her shoulders and throws her head back and her chin forward. This stiffness of attitude, this muscular splinting, is in itself a sufficient indication not only of disease of the spinal column, but of the plan of treatment which should be instituted. The child also has a peculiar grunting respiration which is characteristic of spondylitis. As I lay her across my lap, with the arms hanging over one thigh and the legs over my other thigh, and stretch my thighs apart a little, so as to make slight traction on her spine, you see she becomes perfectly comfortable and the grunting respiration ceases.

The physicians who sent this child here thought that there was no disease of the spine, because pressure over the spinous processes produced no pain. You should not expect to elicit pain by such pressure; very often, instead, the pain is diminished by laying the child upon its face and pressing on the knuckle in its back, as this pressure tends to separate the anterior parts of the bodies of the vertebræ where the inflammation exists, and so relieves pain, while by crowding the head and buttocks together these same inflamed vertebræ are pressed more closely together and pain is elicited. Please bear this fact in mind: it is pressure in the long axis of the body that causes pain, and not direct pressure on the knuckle itself, except in unusual instances, where the spinous process itself is inflamed.

Many people think the deformity is the disease; but it is not so, for the disease has been there long before the projection was visible; there has been an inflammatory process which has caused a crumbling away of the anterior portion of the bodies of the vertebræ, and it is this which causes the projection of the spine.

If the disease is detected in its early stages, before the deformity occurs, and proper treatment is then instituted, in many cases recovery will take place without deformity.

This instrument which I hold in my hand is called Seguin's surface thermometer; it is a very delicate test for differences in surface temperature. As I approach the instrument to the diseased area, you can all see that the index rises, showing that there is an increase of surface temperature at this point. It is an exceedingly useful instrument for determining obscure inflammatory action going on in the body.

We shall now apply to this child the only treatment which is proper at present,—namely, rest and extension in the cuirass.

I have frequently had little children brought to me wearing plaster jackets which slipped up and down on their bodies and were simply an additional weight for their already enfeebled spines to carry about. It is almost impossible to apply a plaster jacket to any child under the age of three years and have it of use. Exceptional children may be so large for their age that it is possible to get a sufficient grasp on the ilium, but such cases are very rare, and in the present instance the child is altogether too small to allow the application of any apparatus which will permit it to walk, and the very fact that it is horizontal in its cuirass will greatly improve its chances of recovery, while its small size makes it very easy to care for it in the cuirass, which would not be the case if it were ten or twelve years old.

Here is a cuirass,—a wire framework roughly approximating the shape of the body, and padded on the inside like a mattress. The part where the buttocks rest is protected by rubber sheeting. A jury-mast is also applied to the cuirass. The child is bound fast to the apparatus by roller bandages, and the feet secured to the adjustable foot-pieces. If the parents cannot afford to purchase a cuirass, you can make a substitute by placing the child on a piece of paper and making an outline of the body, and from this pattern cutting out a similar apparatus from a piece of board and padding it. It is important that the child should be carefully adjusted so that the anus shall come opposite the opening. (Fig. 1.)

We now fasten the leather head-piece under the chin and occiput, and fasten the upper ends of the strap to the cross-bar, which is attached to the jury-mast by means of an elastic strap, and make just sufficient traction on the child's head to overcome the muscular spasm which is always present in disease of any joint. In this child the disease is so high up that it is necessary, in addition to keeping it horizontal and making traction by its head and heels, to hold the shoulders securely back against the cuirass, which I do by means of a little steel rod which passes from the tip of one shoulder across the chest to the other shoulder, the ends terminating in hollow hard-rubber cups, which fit the tips of the shoulders comfort-

FIG. 1.



Padded cuirass with jury-mast attached.

ably. These cups are held firmly against the shoulders, holding the latter back against the cuirass, by means of straps which pass above and below the shoulder to the back of the cuirass, where they are secured by buckles. The bar which passes across the chest is made of two pieces, which slide past each other and are retained in position by two set-screws, which enable the bar to be elongated as the child grows larger. This apparatus is an adaptation of Dr. Whitman's support in cases of high dorsal disease, which he uses in children that are walking about, and which I have applied with very good result in a number of cases treated in the cuirass. (Fig. 2.)

CASE II.—You recollect the child from Philadelphia who was here last Wednesday: I saw that child only once before, and that was last February. When only nine months old it fell and injured its spine in the mid-dorsal region. Some physician in Philadelphia who thought the jacket and jury-mast were the only means of curing disease of the spine applied a plaster jacket and jury-mast to this little one, with the result that the lower extremities became paralyzed and the child was left in a terrible condition. She was only three years old when I saw her, and only one when the jacket was applied. The trouble in this case was that there was no pelvis to support the jacket. It is utterly impossible to put a jacket or jury-mast on a child who has no pelvis to put it on, and this is the case with all children not more than a year old. Do not attempt, therefore, to do the impossible, and at the same time bring into discredit a treatment which, when rightly used, is a great blessing to humanity.

I placed this child in a cuirass and taught the mother how to attend to it. With the exception of seeing it the next day, it was not under my supervision from that time until it was shown to the class the other day. At this time the projection was very much less than before, and the child was in every way improved. I brought it before you to show you that the mother or any one else who puts her heart and soul in the thing can attend the child properly. The great majority of physicians have too much else to attend to or take too little interest in the case to give it the proper attention: hence the nurse or mother must be taught the details of treatment, if you would succeed.

I have found that the simpler your apparatus, and the more perfectly the nurse, mother, or other attendant understands the practical application of it, the better will be the result. It is impossible for me to see all my patients daily, and if proper instructions are given there will be no trouble in securing effective co-operation on the part of the parents or relatives.



FIG. 2.



FIG. 4.

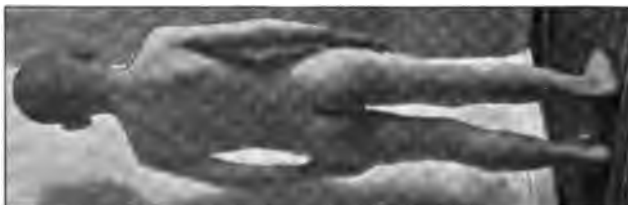


FIG. 5.



FIG. 6.



FIG. 7.

I should advise the father of this child to procure an easy, springy, rattan baby-carriage, fitted with cushion-tired bicycle wheels, so that the child can be readily carried around out-doors, in this easy-riding carriage, without any jarring. (Fig. 3.)

FIG. 3.



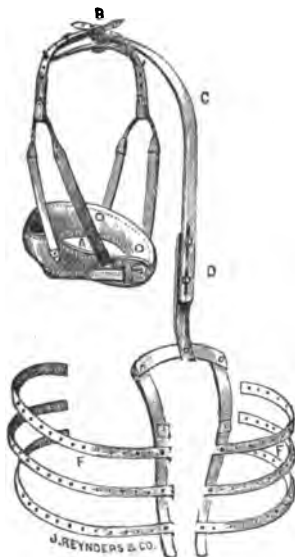
Baby-carriage for child in cuirass. Made extra long and with rubber-tired wheels.

CASE III.—Here is a little girl, ten years of age, who had nothing done to her for six or seven years. She first came under our observation six months ago, and at that time was very tender and much emaciated. She was put up in this jacket and jury-mast, and has been more comfortable; but, as you see, the deformity is very great. (Fig. 4.) Although the case presents unusual difficulties as regards the proper application of apparatus, you see it has been done very thoroughly, and the relief of pain and tenderness is complete. Of course we cannot expect to cure the deformity in the case of this little girl, the great secret of success being to diagnose the disease in the early stages and begin treatment then, before deformity has taken place, when it is often possible to cure these cases without deformity, as in these patients, who have worn jackets for periods of from two and a half to three years, and who now, as you see, have practically normal spines. (Figs. 5, 6, 7.)

CASE IV.—Here is another girl who was brought to me two years ago with disease of the right hip. She was put to bed with a weight

and pulley, and with a blister over the trochanter. Afterwards she was put on a long hip splint, which she wore until entirely well. A few weeks ago she returned, having developed disease in the dorsal vertebræ. Owing to sickness in the family, she did not return again until a few days ago, when a jacket was applied. We shall now add to this jacket a jury-mast, which will enable us to make traction on the head. There is quite a prominent knuckle in the upper dorsal region. She gives no history of having fallen while going about on her crutches, and we cannot say what is the cause of this present trouble. Her father is a healthy-looking man, and the child herself has rosy cheeks and appears to be well nourished and healthy; yet the history would

FIG. 8.



Jury-mast complete, with a firm basis of support to be incorporated in a plaster-of-Paris jacket.

FIG. 9.



Jury-mast and plaster-of-Paris jacket applied.

seem to indicate a possible constitutional defect. This girl should be contrasted with the cases which you have just seen. The other one before you is in the early stage of the disease, and consequently we can promise, if the treatment is properly persisted in, to effect a cure. The jacket has added very much to her comfort, but there is still some pain

present, which is relieved by traction, so we shall now add the jury-mast. (Fig. 8.) The plaster jacket is first wet, and a few turns of fresh plaster-of-Paris bandage are applied. The jury-mast is placed in the exact median line of the body, and in such a position that the cross-bar is directly over the middle of the head. (Fig. 9.) Sometimes the jury-mast comes from the instrument-maker's with the transverse strips of tin passing entirely across the upright pieces. The portions of tin embraced between these two uprights at the bottom of the jury-mast should be clipped out, otherwise, if there is a very prominent knuckle on the spine, the tin strip is likely to exert injurious pressure on it.

Some orthopædic surgeons prefer a rigid chin-piece to the head-sling of the jury-mast; but the patients, after trying both, always prefer the jury-mast, notwithstanding its less elegant appearance, because of the greater elasticity and comfort.

CASE V.—Here is a boy who has had disease in the lower lumbar region for a long time, and who had practically no treatment until I saw him about eight months ago. He is now wearing a plaster-of-Paris jacket; the deformity is not marked, and the boy will in time recover completely. You notice that his jacket is pressed in close to the crests of the ilium. This "waisting-in" of the jacket is very carefully done while the jacket is still moist. This is a detail of treatment which is especially important when applying plaster jackets to young children.

CHRONIC ULCERS OF THE LEG.

CLINICAL LECTURE DELIVERED AT ADDENBROOKE'S HOSPITAL, CAMBRIDGE.

BY SIR GEORGE MURRAY HUMPHRYS, F.R.S., M.D., LL.D., Sc.D.,
F.R.C.S.E.,

Professor of Surgery in the University of Cambridge, and Surgeon to Addenbrooke's Hospital.

GENTLEMEN,—Chronic ulcers, that is to say, simple chronic ulcers, are peculiar, or nearly so, to the lower half of the leg, more particularly the inner and fore part of the leg, and the adjacent region of, or behind, the malleoli. In other words, a simple ulcer rarely holds its ground in any other part of the body. If, therefore, you see an ulcer of such standing and of such characters as to be rightly called simple chronic ulcer in any other part of the body, except, of course, a bed-sore, you may infer, indeed may be almost sure, that there is something special in its nature, that it is syphilitic, cancerous, or tubercular, or is maintained by some peculiar persistent local source of irritation. We often find an ulcer at the side of the great toe nail, but it is maintained by pressure and chafing upon the bare jagged edge of the nail, and is quickly cured by removal of the nail. Ulcers, or fissures as they are called, within the margin of the anus persist because they are, time after time, torn open by the passage of *fæces* through the sphinctered part; and they heal when the sphincter is divided, stretched, or otherwise impaired. From a nearly similar cause a crack or ulcer at the edge of the middle of the lower lip is often a source of continued annoyance; but it is cured by collodion, or some application which prevents the tearing apart of its edges by the action of the orbicularis muscle. An ulcer in the damaged skin under the thick, hard cuticle of a corn will remain for a long time, and may perforate the tissues down to the bone or joint, especially if there be any atrophic, neural, or senile condition of the part. If, however, irrespective of these causes, we find an ulcer or ulcers upon the toes or in the clefts, behind them, about the anus or the lip, we suspect syphilis, unless the base and edge be hard from cancerous infiltration or the surround-

ings dotted with tuberculous points. The ordinary simple ulcer rarely is met with in these parts. Let us then consider how it comes about that ulcers so often affix themselves and hold their ground on the lower part of the leg while other regions of the body are so free from them.

VARIX CONSIDERED AS A CAUSE.

Varix is one of the causes, perhaps the most frequent one, though I think its influence in this respect is somewhat overestimated. The internal saphenous vein has a longer subcutaneous, that is, comparatively unsupported, course than any other vein in the body, and it bears the weight of a long column of blood; and the frequency with which its coats yield under the pressure exerted shows that it is scarcely equal to its requirements. A varicose state of the vein does not interfere directly with the circulation in the skin, or with the nutrition of the skin, for the blood-current through the small vessels of a part is but little, commonly not at all, affected by the increased calibre or varicose condition of the vein leading from it. The blood-stream in the dilated vein itself is slowed, but not so that in the tributary vessels, any more than the stream through a pipe or system of pipes is affected by the bulging of the tubes at one or more parts. An illustration in point is furnished by the testicle, which does not seem to suffer in size or structure or activity in consequence of varicocele, even though the dilatation of the spermatic veins be very considerable. The way in which a varicose vein acts injuriously upon the skin is, *first*, by throwing the covering skin into prominence, and so subjecting it to friction, which may induce irritation or inflammation, and often leads to pigmentation, or other degenerative changes, and perhaps may induce ulceration of the skin. *Secondly*, these changes are further promoted by the pressure of the dilated vein causing atrophy and absorption of the subcutaneous tissue, including the blood-vessels, and so interference with the blood-supply to the skin. *Thirdly*, the stretched vein-walls and the immediately investing tissue are liable to inflame; and the inflammation with extravasation or proliferation, or both, of cells spreads around, causing œdema and induration of the subcutaneous tissue, and probably inflammation. Not infrequently has the dilated soft fluctuating vein, thus circumstanced with its tender surroundings and red covering of skin, been mistaken for an abscess and opened, much to the discomfiture of operator and patient, when blood only was seen to issue instead of pus. *Fourthly*, the slowed blood-stream in the stretched, and more or less altered, epithelial lining of the dilated vein often leads to the formation of blood-clots, which are commonly attended with inflammation

of the vein and its surroundings, extending to and involving the skin. The blood-clots may, and usually do, become removed, and the channel in the vein may become restored, but the effects on the skin may nevertheless remain. By one or more of these various causes, rather than by any immediate effect on the circulation, inflammation of the skin, with its consequences, more particularly eczema and ulceration, may be, and often is, induced and maintained by a varicose condition of the subcutaneous veins.¹

It is worthy of notice, however, that these ill effects, beyond some pigmentation of the skin, rarely take place at or above the knee, even although the vein in the thigh may be considerably more dilated and tortuous than in the leg; nor do they attend upon varix in other parts of the body, except about the anus, where the conditions are peculiar. We must, therefore, search for some other conditions which render the skin and subcutaneous connective tissue of the lower part of the leg so liable to derangement.

OTHER CAUSES.

One of these conditions is, I think, to be traced to the fact that for the purpose (much nullified by the unphysiological construction of our supra-pedal garments) of facilitating progress, especially in running, and to permit the other foot to sweep by without contact, the human leg at, and more especially just above, the ankle is reduced to the smallest possible dimensions, the result of which is that a greater weight is borne upon a given transverse sectional area than in any other region of the body; and this renders the part, as we know, very liable to fractures and to rickety flexures, as well as to affections of the periosteum and other soft parts. In short, all the tissues are placed at a considerable disadvantage by this reduction in size. The muscles are heaped up behind into the calf, and in front into the bulging tibialis anticus and extensors of the toes, whereas below they, as well as the peronei, are reduced to tendons ensheathed in dense fasciæ. This arrangement, while it gives comeliness to the leg and ankle and contributes to the freedom of the step, has, like many other peculiarities of the human

¹ I must, however, not leave the valves out of account. In the natural condition the valves prevent a return current, and facilitate the onward flow by causing external pressure to operate in the right direction, and by counteracting the impulses of the blood-pressure from above during abdominal straining and various movements of the limbs. When in varix, owing to the dilatation of the vein-walls, the valves are rendered inefficient, there is nothing to resist the reflux of blood, which may act prejudicially upon the tributary veins and cause dilatation of them. Even then, however, it does not seem very detrimental to the capillary circulation.

form, its pathological disadvantages. The tissues, compressed within narrow limits, and somewhat tight or stretched, suffer in vascularity. In by-gone years, when it fell to me to inject bodies for dissection, I was struck by the tardiness with which the colored fluid thrown into the aorta permeated this region. Moreover, the skin lying upon the surface of the bone and the fasciæ, and separated from them only by a comparatively thin layer of connective tissue, is very liable to suffer severely from slight injuries. We all know how easily a broken shin is caused, and how much trouble it often gives. These features, then, in the anatomy of the part—the smallness of the circumference or weight-bearing area, and the consequent compactness and relatively low vascularity of the several tissues, bone, tendons, fasciæ, connective tissue, and skin, with their well-known liability to injury—are, I believe, the causes which, in addition to the disturbances attendant upon varix, lead to the formation of ulcers of the leg, and to their continuance when formed.

CAUSES WHICH RETARD HEALING.

The shape of an ulcer which is least favorable to healing is the circular, because in it the skin-forming margin bears the least proportion to the surface to be healed; and, *cæteris paribus*, the more the ulcer deviates from the circular shape, and the more irregular is its margin, the quicker will the healing be. Again, the more adherent and the more compact are the surroundings, the slower and more difficult will the healing of an ulcer prove. An ulcer with soft swollen circumference, and with perhaps a thick, white, overhanging edge of cuticle, will commonly, under moderate carefully-applied pressure by adhesive plaster or other means, soon acquire a level edge, and a delicate red film of cuticle will be seen shooting from the edge over the granulations. This proceeds more slowly as it approaches the centre of the ulcer, where the greatest difficulty in healing is encountered, owing to this part being farthest from the growing or healing base. When, however, the surrounding infiltrating media have hardened, rendering the skin thin, smooth, shiny, and tightly bound to the subjacent bone or fascia, the reparative work is, under the best of circumstances, very slow and, for the most part, inefficient. Even if such an ulcer can be induced to heal, it commonly soon breaks out again, and is as bad as ever, or worse.

CUTICLE-GRAFTING.

I believe good results in such cases as those last named can be obtained in one way only,—namely, by the Thiersch method of grafting,

as you have in several instances seen it done in the hospital. After a few days' rest in bed, sufficient to bring the tissues into a fairly healthy state, the part and the skin for some distance round being rendered as aseptic as possible, the granulations are scrubbed off, so as to get rid of all suppurative germs, and the fresh surface thus exposed, as soon as the bleeding has subsided, is covered over in its whole extent smoothly and carefully with thin layers of cuticle razored off, with the thinnest possible stratum of subjacent cutis, from some healthy region which has also been rendered aseptic. A piece of thin, soft oil-silk no larger than the ulcer is applied, and the limb is covered, from the ankle to the knee, with aseptic cotton-wool and a light soft bandage. After a few days, when the dressings are removed, the cuticular covering will probably be found adherent, and it will usually go on to the formation of good skin much sounder, softer, and more enduring than that which would have resulted after months of the old plans of treatment. This method, which ranks high among the many great improvements in modern surgery, answers so well that we often adopt it in earlier stages before the ulcers are so chronic, and before their surroundings have acquired the firm adherent glossy characters I have mentioned, thus saving time and getting sounder and more supple cicatrices, with less danger of the recurrence of ulceration.

SKIN-GRAFTING.

Before the time at which *cuticle-grafting* came into vogue we used to practise *skin-grafting*,—cutting out, that is, and applying upon the granulating surface of the ulcer small pieces of the whole, or nearly the whole, thickness of the skin. This answered to a certain extent, but not so well as the cuticular grafting. The ulcer was not so well covered, and the skin-pieces did not so firmly cohere and form cicatrizing centres. The part was kept covered up for a week or so after the operation. It was then often noticed that the cicatrization was proceeding briskly from the circumferential skin; and this was by some persons attributed to the influence exerted by the grafts in stimulating the process of cicatrization around. I observed, however, that it occurred whether the grafts had taken or not; and it was, I believe, due in great measure, if not entirely, to non-interference with the ulcer, the cell-growth at the margin being allowed quietly to undergo epithelial transformation instead of being hurried off by removal of the dressing and by the customary ablutions,—a hint which I have often turned to valuable account in the treatment of ulcers even without grafting. Cover up an ulcer which is in a condition suitable for

healing, and do not touch it or look at it for several days, unless copiousness of discharge or other cause requires it to be exposed, and you will probably be surprised at the progress which the unmolested efforts at cicatrization have made.

INFLAMMATORY AND ATONIC ULCERS.

If the ulcer be in the opposite condition,—namely, spreading,—an opposite treatment must be pursued, and the foul discharge and ragged decomposing and detached fragments be washed away by dripping of water, or keeping the limb in a warm-water bath, or by frequent changes of wet antiseptic dressings. Spreading of an ulcer of the leg, when not due to syphilis, is commonly dependent either upon acute inflammation or upon an atonic condition of the patient. In the former case elevation of the limb, with some soothing application and the administration of aperients, will usually check the progress of destruction; and the healing of such ulcers, more particularly if sloughing has occurred, commonly goes on quickly at the circumference, because the surrounding tissues have not had time to become infiltrated and indurated by a persistence of the inflammatory condition in them. Towards the centre, however, the process goes on more slowly, and the thicker, coarser, middle part of the cicatrix may often, for a long time, be distinguished from the finer, more supple, and more quickly formed border. In *atonic ulcers*, the feature of which is that tissue-destruction is out of all due proportion to, or outruns, as it were, the inflammatory cause, the prognosis is bad. They occur, so far as I have seen, most frequently in women, and are dependent upon failing health, combined perhaps with diabetes. The efforts to restore tone to the system are often ineffectual; and the removal of the limb by amputation is too often followed by bad results.

BONES AND FASCIÆ INVOLVED.

In course of time the slow thickening process attendant upon the chronic ulcer reaches the periosteum, causing thickening of it and of the subjacent bone. These specimens from the museum, in each of which you see on the inner side of the tibia a broad, tolerably defined, raised “table-land”-like eminence, are examples of the effects of chronic ulcers beginning in the skin. The process may diffuse itself around the bone, and even extend, as it has done in this instance, to the fibula, which bone is rather liable to periosteal thickening and nodular osteophytes. In one case, in my recollection, of this kind, the ulceration extended into the posterior tibial artery and caused fatal hemorrhage.

I do not remember an instance of the cure of such long-standing, bone-involving ulcers, and should think that cuticle-grafting would offer the only prospect, and that not a very good one, of such a result. In a case where the ulcer was over the fibula, I contemplated cutting away a piece of the thickened bone in its whole thickness, which would probably have enabled the ulcer to heal; but I lost sight of the patient. When an ulcer has perforated the deep fascia and involved the subjacent muscles or tendons, the muscular movements and twitchings constitute a serious hinderance to the formation and maintenance of a cicatrix. Improvement may be effected by the application of splints or plaster of Paris to the foot and leg, or by division of the implicated muscles or tendons, but a permanent good result is rarely attained. Even if the ulcer heals, the tendons or muscular fibres remain involved in the cicatrix, and soon cause it to give way.

ULCERS AT THE INNER ANKLE.

Ulcers beneath and behind the inner malleolus, where there is often a plexus of small dilated veins, though not large or deep, are frequently very irritable and painful, which results apparently from the repeated movements of the part and the stretching of the skin, which is here attendant upon the movement. The requisite quiet is best afforded and healing promoted by the application of a splint along the back of the leg with a foot-piece; or, if the repose in bed requisite for this cannot be maintained, the foot and leg may be covered with plaster of Paris, leaving the ulcer free, and the patient can go about with a knee-rest. In these, and in other cases to which the term irritable is especially applicable, that is to say, where the pain and possibly the spreading are out of proportion to the inflammatory or other obvious cause and may be referred to some nerve-condition of the patient or part, opium is especially beneficial, one, two, or more grains being administered in the twenty-four hours.

OTHER MODES OF TREATMENT.

The effect of a passing inflammatory condition of the skin, such as erysipelas, in promoting healing of a chronic ulcer suggested the application of a blister or acetum cantharidis to the skin around obstinate ulcers, and it has been found in some cases to be productive of good. I suppose it acts by causing the effusion of fresh leucocytes, which more or less clear away the products of past inflammation and leave the tissues more free for reproductive efforts. The plan never had much

acceptance, and, like most other irritating and painful appliances, has fallen pretty much into disuse.

Of all the various modes of treating chronic ulcers, none has held its ground so long and so well as pressure, which seems to act, to some extent, like a blister, by promoting the absorption of inflammatory products and, in addition, by supporting the blood-vessels. Accordingly, its good effects are best seen when the tissues about the ulcer are most thickened by the presence of more or less solid effusion and are in a comparatively quiet or indolent condition. A surgeon who for many years enjoyed a great reputation in this neighborhood for the treatment of sore legs told me that his sheet-anchor was a flannel bandage carefully applied, which regulated the circulation not only by exercising pressure, but also by keeping the limb warm. He showed good judgment in the selection of his material; and the stiff linen or calico bandages of former days have now pretty much given place to those of softer texture. When adhesive plaster is used, in broad strips, over the ulcer and partially or wholly encircling the limb, which acts like a charm in the case of some old sores with thickened surroundings, it should be first soaked in warm water, whereby it is softened and can be more evenly and accurately applied, and is therefore much less irritating. It should be covered by a soft bandage over the foot and leg, and may often, as I have before said, be allowed to remain undisturbed for several days; and in some cases the healing processes will be set up and continued while the patient goes about. I find this, on the whole, to answer better than the Martin's india-rubber bandage, which is liable to cause irritation and an eczematous condition of the skin.

Another very favorite application with us, particularly among the out-patients, is the "gelatin paste," composed of gelatin, glycerin, zinc oxide, and water. This, when softened or rendered fluid by heat, is painted on the limb and covered by a bandage. It forms an un-irritating, close-fitting protection, and exercises some pressure. It may remain undisturbed for several days, and is especially suitable when there is an eczematous condition of the skin around the ulcer. Indeed, in that troublesome affection, chronic eczema of the leg, of which we see so many cases in the out-patient room, I know of no application so serviceable as the gelatin paste. In another form also, that of zinc ointment, the zinc oxide is very serviceable. It is un-irritating and forms a cake about the ulcer which should only be occasionally removed; and it suits, I think, in a greater number of out-patient cases with ulcers of the legs than any other ointment. There is, however, a

great variety of other ointments, as well as of lotions, some stimulating, some sedative, some neutral, in the selection of which observation and experience will aid you. I will make one remark applicable to them all,—viz., that the skin is very sensitive to annoyance from them, indeed from anything to which it is not accustomed. Many a troublesome bad leg, ulcerated or eczematous, has owed its origin to the ointments or lotions under oil-silk, or to poultices applied on and around a simple skin lesion, which might have been avoided by merely protecting the injured part in the first instance with a little collodion, or with a small piece of plaster soaked in hot water and changed as occasion required. It is no uncommon thing to find that, though the original wound has healed, eruptions and ulcers have broken out around which are traceable entirely to the applications that have been made. Where, therefore, such applications (ointments, lotions, etc.) are judged to be necessary, they should be reduced to the minimum in extent and in time that may be requisite for the end to be obtained.

IN THE AGED.

Chronic ulcers of the leg are most common in middle life, and are very common in married women, in whom child-bearing gives rise to varix and swelling of the legs, and whose domestic duties prevent the rest requisite for repair. I have on several occasions called attention to the facility with which the healing of wounds and sores takes place in the aged, which may be one reason for our not more often seeing chronic ulcers in elderly persons, and when they do occur they more readily yield to appropriate treatment than at earlier periods of life. In the out-patient department these ulcers of the leg seem to me to do best when the patients have well passed the middle term of life. I suppose the tissues, being drier and with lower nerve-sensitiveness, are less liable to suffer from the various disturbing causes which lead to ulceration and prevent healing; just as, and probably for the like reason, the old frame is less amenable than the young to the evil action of contagious influences. It furnishes, that is to say, a less succulent and fertile soil for bacterial germination; and this has a local as well as a general preservative purpose. I have sometimes thought also, however improbable it may seem, that, irrespective of a less liability to disturbance, the work of repair goes on as quickly as in the young, if not even more quickly.

EPITHELIOMA.

In common with other surface-parts which have long been subject to some irritation and have in consequence suffered a lowering of

nutritive force and of resistance to disease, chronic ulcers are liable to be the seat of epithelioma, which, infiltrating the skin and giving it a raised, hard, knotty edge, spreads over the ulcer, giving it an uneven, coarsely granular surface, with thin, perhaps bloody, discharge. It eats into and destroys the subjacent tissues, causing ragged holes in the bones like those which you see in these specimens from the museum, some of which look as if they had been gnawed by an animal. The absorbent glands in the thigh do not early become involved, not nearly so early as they do in the case of the more numerous and active lymphplexuses and glands about the mandible and neck when the lip or the tongue is the seat of this disease. It is not a very painful affection, and is usually allowed to go on till amputation of the limb is the only recourse.

EFFECT ON THE GENERAL HEALTH.

There is one further point to which I would direct your attention, that, namely, of the relation of chronic ulcers to the general health, or rather the influence which they exert upon the body, and the effects which are liable to ensue upon their closure. Such is the mutual interdependence of the several parts of the body that a wrong-going in any one must be felt in the others; and though an ulcer in the skin of the leg may be a comparatively little matter, still the abnormal process concerned and the discharges, together with the attendant nerve-irritation, must have some influence, and that, under ordinary circumstances, can scarcely be a beneficial one. It may be evinced in a slight general depression of which some persons are conscious; they do not feel quite so well during the time of the existence of a sore leg, and feel better when it is healed; and on this, as well as other accounts, the period of its existence should be curtailed. But the further question arises whether in certain slightly deranged conditions of the system the influence of the ulcer may be beneficial and the effect of its closure be prejudicial. It may be that its appearance in some way meets a rising want, as occasionally does a purge or a sweat, or as the outbreak of the eruption of measles relieves the preceding symptoms, or as an attack of gout often clears the constitutional atmosphere. A friend, whose authority no one would doubt, has told me that when a small patch of psoriasis, which he has long had on one leg, is in abeyance, he is subject to slight though distinct evidences of disordered health, which disappear as soon as the irritation from the greater activity of the psoriasis returns. Such a "derivative" idea was the basis of the theory upon which issues and setons were employed formerly as a

means of preventing and suppressing disease ; and we cannot say there is nothing in it. It may be that there is a great deal in it which we should recognize if we knew better how to observe and interpret phenomena. There is, however, still another point, which more concerns us in relation to chronic ulcers and their treatment, which is this. The ulcer may have, and commonly has, originated from an accident or some local cause, and had therefore, at first, no connection with any particular condition of the system ; but by long continuance it may have acquired an influence, and have become more or less advantageous or necessary to the system which has in time been habituated to it and accustomed to rely, as it were, upon it. The difficulty in determining this arises in no slight degree from the fact that sufferers from chronic ulcers commonly belong to the class of persons whose struggle for existence prevents much heeding of slight health-derangements, and who are, therefore, not likely to observe, still less to remember, any variations that may be associated with the open or the healed state of an ulcer. Still, we do find patients who have had long personal experience of the kind remarking that they feel best when the ulcer is open, and that when it is closed they suffer from heaviness, loss of appetite, and, not unfrequently, a sense of sinking at the pit of the stomach ; and we now and then meet with cases in which more serious symptoms, such as those of apoplexy or heart-failure, follow upon the closing of a long-standing ulcer. Without attaching too much importance to these exceptional cases, we ought not altogether to ignore them or to turn a deaf ear to the statements respecting them, on the ground that our pathological knowledge does not afford us a satisfactory explanation of them. They should leave some mark upon us causing us to inquire with care into the general condition of each patient with an old ulcer, and the history during the progress of the ulcer, more particularly whether the variations in it have been associated with any variations in the health ; and we should act accordingly, suggesting perhaps some alteration in diet, or prescribing some mild aperient or so-called alterative to be continued during, and for some time after, the healing of the ulcer. The more rapid and decided method of cure which cuticle-grafting places in our hands renders some precautions of this sort still more desirable. We need not revert to the practices of the Abernethian era and treat sore legs with blue pill,—such excursions from the orbits of common-sense gravitation being usually followed by more or less production of corresponding movements in an opposite direction. We do well, however, to let the thoughts of past periods have their weight in determining the views

of the present, and not, in the pride and presumption of recent advance, to think that our fathers were all wrong. As I have already said, the relation of local disease to the constitution is a matter of peculiar difficulty, which must await its solution in the pathological developments of the future, combined, as they should be, with accuracy of clinical observation.

SUPRAPUBIC CYSTOTOMY FOR THE FORMATION OF AN ARTIFICIAL URETHRA.

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY COLLEGE OF MEDICINE.

BY HUNTER MCGUIRE, M.D., LL.D.,

Professor of Clinical Surgery in the University College of Medicine, Richmond,
Virginia.

GENTLEMEN,—The patient I present to you to-day is a man sixty-eight years of age, who has hypertrophy, or enlargement, of the prostate gland. As the trouble is one you will frequently meet with in practice, and as the logical treatment of the disease is based upon a correct appreciation of the anatomy of the parts, the etiology of the condition, and the pathological changes which occur, I shall, contrary to my usual custom, devote my entire time to-day to this one case.

The prostate gland is situated at the neck of the bladder, which it aids in supporting, and surrounds the first inch of the urethra. It is in close relation to the pubis in front and the rectum behind, and is about the size and shape of a horse-chestnut. It is composed of fibrous, muscular, and glandular tissues, and might as appropriately be termed the prostatic muscle as the prostatic gland.

The prostate is divided into two lateral lobes by a deep notch behind, and by a furrow on its upper and lower surfaces. The so-called third or middle lobe is that portion which is between the two lateral lobes, at the under and posterior part of the gland, and lies just beneath the neck of the bladder. The function of the prostate gland is purely sexual. It contracts spasmodically at the beginning of a sexual orgasm, and forces the semen from the prostatic sinus into the urethra in jets or spurts. In its normal condition it neither assists nor retards the flow of urine, but when the gland becomes hypertrophied, as a result of changes in its size and shape produced by disease, it may act as a mechanical obstruction to the flow of urine, and produce great suffering, or seriously endanger life.

The amount of obstruction and the symptoms produced by hypertrophy of the prostate depend more upon the form and direction of the enlargement than upon its size. Thus, for instance, a growth

which directly encroaches upon the lumen of the prostatic urethra or the neck of the bladder would produce more trouble than a much larger growth which projects into the free cavity of the bladder or extends towards the rectum. Hypertrophy of the prostate is a disease of advanced life, and rarely occurs in men under fifty-five years of age. One-third of the men past this age suffer with bladder-trouble from enlargement of the prostate, and the trouble is so common that I wonder it was not included in that vivid description of old age found in the last chapter of Ecclesiastes. Hypertrophy of the prostate is due to an increase of the muscular and fibrous elements of the organ, the glandular constituent undergoing little or no change. It may be simply a symmetrical enlargement of the whole prostate, thus increasing the prostatic urethra three or four times its normal length; or one of the lateral lobes may enlarge more than the other, thus compressing the urethra to a mere slit or chink; or the middle lobe may alone enlarge, and thus constitute a bar which obstructs the internal orifice of the urethra.

Various theories have been advanced by different writers as to the etiology of the disease. Guyon believes that the hypertrophy of the prostate is due to general atheroma. Lydston thinks that as the prostate is a sexual and not a urinary organ, the explanation of its pathological changes must be in the direction of some perturbation of its physiological function, and attributes its hypertrophy to what he terms "prostatic overstrain," due to excessive venery. Harrison takes the view, and my own clinical experience confirms his theory, that prostatic hypertrophy is secondary to changes which occur in the bladder itself from senility. The bladder in early life is almost an abdominal organ, but as years go by it descends lower and lower into the pelvis, until in old age the posterior wall has sunk to a lower level than the outlet of the organ. As soon as this occurs, incomplete evacuation of the bladder can be prevented only by repeated and prolonged efforts of the muscular elements of the wall of the bladder and of adjacent muscles, and hypertrophy is the result. The prostate participates in this compensatory hypertrophy, and its enlargement adds to the obstruction and increases the violence of muscular contraction. Changes occur also in the bladder itself, which according to the theory of Lydston are the result of the hypertrophy of the prostate, and according to Harrison occur before the enlargement of the prostate takes place, and bear a causative relation to its increased growth. Be this as it may, pouches form in the walls of the bladder, and urine collects in these depressions, which is called "residual" because it cannot

be expelled. This residual urine decomposes, undergoes ammoniacal decomposition; ptomaines are formed, which irritate the bladder and cause cystitis. The mucous membrane of the bladder becomes congested, thickened, and inflamed, and unless relief is afforded the process extends to the ureters and kidneys, causing ureteritis, pyelitis, pyelonephritis, and death.

The first symptom of enlarged prostate is increased frequency of making water, especially at night. The patient complains that the flow is slow to start, that a longer time is necessary for the act, and that the stream is not projected far from the body, but drops perpendicularly to the ground. There may be a sense of weight, fulness, and discomfort in the bladder, due to the residual urine, which cannot escape on account of the prostatic dam.

Sudden retention of urine may occur, or there may be incontinence, or dribbling, due to over-distention of the bladder. Soon there is cystitis, due to ammoniacal decomposition of the urine, and the water becomes alkaline, fetid, and loaded with mucus. Pain and vesical tenesmus are constant, sleep is disturbed, the general health fails, and the condition of the patient is pitiable.

The diagnosis of prostatic hypertrophy is not difficult. If a patient past middle life comes to you and complains that he has to get up two or three times during the night to make water, that his stream is feeble, that even after prolonged efforts he fails to satisfactorily empty his bladder, that he "never feels as if he had done," that his urine has an ammoniacal smell, and that a sediment forms in the pot which looks like white of egg, you may suspect that his prostate is too large. If, after he has emptied his bladder as completely as he can, the introduction of a catheter shows the presence of residual urine, and if a digital examination of the rectum shows that his prostate is larger than normal, your suspicions become certainty.

The cystoscope, which you saw me use last week in making a diagnosis of a case of tuberculosis of the bladder, unfortunately cannot be used in this trouble. The growth of the prostate and the alteration it has caused in the curve of the urethra prevent the introduction of so short beaked an instrument, and hence we are deprived of the positive and accurate information which a view of the interior of the bladder would give.

Frequently hypertrophy of the prostate is accompanied by the presence of a stone in the bladder. This complication intensifies the symptoms and hastens the termination of the disease. The presence of a stone may be suspected if exercise, riding in a rough vehicle, or

sudden jars increase the pain and irritability of the bladder ; its existence can be definitely proved only by the use of the sound. Sometimes, when from the symptoms, and from the character of the urine, you are certain that there is a stone in the bladder, you will be unable to touch it with the instrument, because it has lodged in a deep pouch behind the prostate gland. In these cases the patient should be placed in Trendelenburg's position, as the stone will then be displaced by gravity and come within easy reach of the point of the sound, unless, as is rarely the case, it has become encysted or adherent to the walls of the bladder.

What should be the treatment of enlarged prostate ? If the growth does not seriously obstruct the flow of urine, if the patient does not have to get up more than once or twice during the night to empty his bladder, if he suffers little or no pain, and if the catheter shows that only one or two ounces of residual urine have been retained, and that it is clear, and there is no evidence of ammoniacal decomposition, then drugs or local treatment are contra-indicated. The patient should be directed to empty his bladder as regularly and completely as possible, to prevent becoming chilled, by dressing warmly, to avoid getting his feet wet or sitting on a cold stone or a damp saddle, to eat only easily-digested food and keep his bowels open, and to let whiskey and other alcoholic drinks alone. If the patient has to get up to empty his bladder so often during the night that sleep is seriously interfered with, if pain in the bladder and tenesmus are constant, and if the catheter shows that the residual urine exceeds two ounces, and is cloudy and alkaline, then, in addition to the observance of the general measures just mentioned, systematic use of the catheter should be commenced. The patient should be given a soft-rubber instrument, and directed to introduce it into his bladder and draw off the residual urine once, twice, or three times a day, according to the indications of the case. Careful instructions should be given for keeping the catheter clean, and the patient should be cautioned to throw the instrument away and buy another as soon as it shows any evidence of wearing out. In some cases, where the urine is fetid and cystitis is pronounced, great benefit may be effected by irrigating the bladder once a day with some feeble antiseptic solution, such as a one-per-cent. solution of acetate of aluminum, a two-per-cent. solution of carbolic acid, or Thiersch's solution of boric and salicylic acids.

Fortunately, the majority of cases of hypertrophy of the prostate need only the treatment just spoken of, but in a certain proportion of cases there comes a time when general measures and local use of the

catheter fail to give relief. The catheter becomes more and more difficult to introduce, and when withdrawn is followed by straining and tenesmus and no relief to the sufferer. Sleep is broken and disturbed, the appetite fails, and breaking down of the general health soon follows. Interstitial injections of iodine, ergot, sclerotic acid, and other drugs into the prostate have been tried, without good results. Electricity has been employed in various ways, but without success or even temporary relief. It is by surgery, and by surgery alone, that you can hope to prolong life.

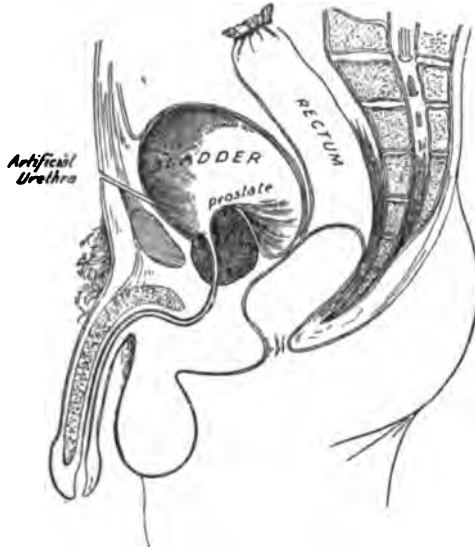
There are two principles upon which operations for prostatic overgrowth are based: one is to excise the portion of the prostate gland which interferes with the flow of urine, and thus relieve the obstruction; the other is to let the prostate alone and make a new channel by which the water can escape. On the first principle are based the various operations of prostatectomies; on the second is based an operation which I myself have devised, and which I wish to show you to-day.

A prostatectomy consists in the enucleation or removal of the portion of the prostate gland which obstructs the passage of urine. The prostate gland is exposed by opening the bladder by either the perineal or the suprapubic route, the latter being the preferable, as it enables the surgeon to see what he is doing and gives more room in which to work. The mucous membrane covering the projecting or obstructing portion of the prostate is cut through, and the removal completed with the fingers, rongeur, forceps, or *écraseur*. The operation is tedious and difficult, the hemorrhage is often alarming, and the mortality is from nine to twenty per cent. in the hands of the best surgeons. If the views of the etiology of the disease advanced by Harrison, Guyon, and Thompson are correct, if the enlargement of the prostate is not a local process, but is secondary to general and local changes which occur with advanced age, then the operation of prostatectomy is aimed at the result rather than at the cause of the trouble, and hence is illogical and valueless. When we consider the fearful risk of death from a prostatectomy, when we remember that it is not always possible to remove the obstructing growth in this way, and that even if removed it may recur, when we know that if atony of the bladder exists the organ will never regain its power or be able to expel its contents, and when we take into consideration the fact that the patient is usually old, broken down from long suffering, with nephritic disease impending or already in existence, we naturally look for some less hazardous and more certain means of relief. Such an operation is based upon the second of the two principles I have already mentioned, and was first

published in the *Transactions of the American Surgical Association* in 1888, and consists essentially in the formation of an artificial urethra, through which the patient can expel his water.

The prostate is left untouched, and a new channel is made, whose length is the thickness of the anterior abdominal wall, which communicates internally with the bladder, and opens externally in the median line just above the symphysis pubis, as shown in the accompanying illustration (Fig. 1).

FIG. 1.



Topography of the artificial urethra formed in advanced cases of prostatic enlargement.

The operation is simple, the time consumed is inconsiderable, the relief afforded is instantaneous, and the mortality in my hands has not been more than three per cent.

The patient on whom I am going to show you the operation for the formation of an artificial urethra has received careful preparatory treatment, and is in good condition to stand the operation and to make a speedy recovery. He has been under observation for several days; his bowels have been carefully regulated, the action of his skin stimulated by daily baths, and his heart examined to ascertain the safety of the anæsthetic. His urine has been carefully tested, chemically and microscopically, by the pathologist of the hospital, and his report shows that it is alkaline and contains an excess of phosphates, but there is no evidence of kidney-disease. The alkalinity

has been corrected by large doses of citric acid administered in the form of lemonade.

Wounds in the bladder heal kindly and readily when the urine is acid; but if the urine becomes alkaline, regenerative changes do not occur, and the surface of the wound becomes dry, glazed, and covered with a slough. Bacteriological research has proved that germs cannot live in an acid medium, and clinical experience has led me to believe that feebly acid urine is aseptic, and that strongly acid urine is antiseptic. Hence the importance of correcting alkalinity of the urine before doing any operation in which it will necessarily come in contact with the wound. Phosphoric acid, salol, and many other drugs may be employed to effect this purpose, but lemonade is my favorite agent. This morning the patient's rectum has been emptied by a simple enema, and he has taken three doses of sulphate of quinine, of five grains each, to prevent shock and promote reaction. Since he has been chloroformed you have seen my assistant prepare the site for the operation. The skin above the pubes has been cleanly shaved and well scrubbed with potash soap and warm water. It has then been washed with alcohol and covered with a towel wrung out of a warm solution of bichloride of mercury. I shall now supervise the final preparations myself, as they are most important. A rubber catheter is inserted into the bladder and the organ thoroughly irrigated with a two-per-cent. solution of boric acid. The patient's limbs are next flexed on his abdomen, and a rubber bag inserted into his rectum above the internal sphincter. This rectal bag is filled with water by means of a syringe, and the patient's legs again extended. Great care should be taken not to fill the bag too full, as many cases are on record where the bowel has been ruptured or fatal hemorrhage produced by over-distention of the rectum. Usually from twelve to fourteen ounces of water will be sufficient. The object of the rectal bag is to lift the bladder out of the pelvis, and thus bring its anterior wall, which is uncovered by peritoneum, opposite the point in the abdominal parietes through which your incision is to be made. If you are called upon suddenly to do the operation and cannot get a rectal bag such as I am using, you can fill the rectum with sponges or cotton and accomplish the same purpose.

The rectum having been distended, I now pump four or five ounces of water into the bladder, to distend its walls. I remove the catheter and tie it tightly around the penis, to prevent the escape of the fluid. The lower part of the abdomen is again flooded with an antiseptic solution, the penis closely wrapped in a piece of gauze, and the patient

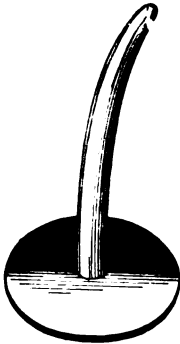
is ready for the operation. With a small scalpel I make an incision through the skin and superficial fascia in the median line, commencing about two inches above the pubic bone and extending down to the level of its upper border. The recti muscles are now exposed, and I separate their fibres with the handle of my knife, and the wound is deepened to the transversalis fascia. This I incise, and you see the prevesical fat, which always lies just in front of the bladder. There are several large veins running through it, so I shove them aside without injuring them, and scratch through the friable tissue. My finger now rests upon the wall of the bladder, and I can plainly feel the fluctuation of the water it contains. Formerly I used to hook the bladder with a tenaculum before opening it, but this is unnecessary. I place the back of my knife closely against the upper border of the pubis, and boldly push its point through the wall of the bladder and cut upward about half an inch. You can see by the gush of water that its cavity has been entered. Before all the fluid can escape and the bladder contract, I introduce my finger through the opening I have made and examine the interior of the viscus. There is no stone. The prostate is greatly enlarged. The mucous membrane lining the bladder is thickened and hypertrophied. My assistant lets the water escape from the rectal bag, and removes it from the rectum, and the bladder sinks down in the pelvis to its normal position. I follow the bladder as it descends into the pelvis with my finger. I introduce a rubber catheter along the finger into the bladder, and, to prevent its slipping out, I take a stitch through its walls and the skin at the margin of the wound, and the operation is completed. It has not taken me more than two minutes, and I have used no instrument except this little knife. The loss of blood has not exceeded a teaspoonful, as the incision has been made through tissues which contain no vessel large enough to be dignified by a name.

The wound is dressed simply by laying some gauze around the catheter, and the patient is put to bed, and the free end of the catheter inserted into the neck of a bottle to catch the urine, which it will siphon from the bladder as fast as the kidneys excrete it. No stitches are employed, nor any effort made to approximate the surfaces of the cut. The wound will heal by granulation, and in two weeks only a fistulous tract will be left in the line now occupied by the catheter. You might naturally ask why the result which I accomplish could not be secured by distending the rectum, filling the bladder with water, plunging a trocar into it, and inserting a drainage-tube through the canula. This has been tried, not by myself, but by

men who possess greater confidence and boldness, with disastrous results. Urinary infiltration occurred, and the lives of the patients were saved only by prompt and heroic measures.

The after-treatment of the patient I have operated on is simple.

FIG. 2.



Silver plug for artificial suprapubic urethra.

He will be kept in bed for two or three weeks until the wound heals, his urine kept acid by the administration of lemonade or drugs, and his bowels kept open by the regulation of his diet or the use of simple laxatives. At the end of two or three weeks the wound will have become cicatrized, and the artificial urethra lined with a coating closely resembling, if not identical with, true mucous membrane. The patient will then be allowed to get up, and a silver plug or stopper (Fig. 2) will be placed in the opening.

This plug should have a diameter of about a No. 12, American scale, bougie, and should be just long enough to enter the bladder. Its purpose is to keep the opening patent, and to act as a stopper and prevent dribbling of urine. It should be constantly worn, and never taken out except when the patient wants to make water.

Some sort of belt has to be worn to prevent the plug from slipping out and being lost, and the contrivance shown in the accompanying cut (Fig. 3) has been devised by one of my patients. It consists essentially of a belt which goes around the hips and passes over the plate of the plug, thus retaining it in its position. This belt is prevented from slipping up or down by being attached to a second belt above, which is supported by the hips, and by perineal bands which encircle the thighs.

The result of the operation for the formation of an artificial urethra has been very gratifying, both in my hands and in those of other surgeons. The patients can retain their water without discomfort from three to six hours in the day, and from six to eight hours at night, cystitis rapidly dis-

FIG. 3.



Apparatus for retaining silver stopper in suprapubic urethra.

appears, and often the prostate shrinks so that the patient can again pass his water by the natural channel. In these cases the great anxiety of the patient to keep the artificial channel open, and the fear he shows of its closing, are strong attestations to its merits.

Only yesterday a patient came into my office for whom I had made this artificial opening in his bladder eight years ago, to consult me for some other trouble. He still passes his water through the suprapubic opening, and, although his condition is not entirely free from annoyance, he has no pain or discomfort.

TENO-SUTURE AND TENDON ELONGATION AND SHORTENING BY OPEN INCISION; ADVANTAGES AND DISADVANTAGES OF THE VARIOUS METHODS.

CLINICAL LECTURE DELIVERED AT THE JEFFERSON MEDICAL COLLEGE HOSPITAL.

BY H. AUGUSTUS WILSON, M.D.,

Clinical Professor of Orthopædic Surgery in the Jefferson Medical College and in the Woman's Medical College; Professor of General and Orthopædic Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine, etc.

GENTLEMEN,—In a former clinic you saw the subcutaneous methods of dividing tendons demonstrated by suitable cases, and heard the merits of each one discussed and the disadvantages indicated. This morning I shall speak of the different open methods of splicing, shortening, and elongating tendons, and shall endeavor to point out clearly the advantages and disadvantages of each one, and illustrate them.

Subcutaneous tenotomy obviates, in a great measure, the risk of suppuration, but at times the disadvantage of failure of union obtains, whether from simple failure of the tendon ends to unite, or from nutritive or suppurative changes, or from muscular action disturbing the relation of the ends. Again, faulty union may occur from insufficient tendon surfaces being in contact, or from the united portions being too small and thin, thereby causing a weakness of the parts: so that in doing a tenotomy or a teno-suture many points must be carefully considered in order to insure safe and good results. In cases with inactive muscles the results are apt to be much less satisfactory than otherwise, as there is generally interference with nutrition.

Cases which have previously had cellulitis or traumatism about the tendon frequently prove very unsatisfactory because of the cicatricial tissue in the part and the danger of again exciting the inflammatory processes.

¹ Reported by J. Torrance Rugh, M.D., chief clinical assistant of the Orthopædic Department.

Simple division of the tendon does not always allow sufficient correction of the deformity; for example, after an abscess in the foot, contractures, due to the adhesions about the tendinous parts and the extensive infiltration of the connective-tissue structures, prevent correction, even though tenotomy has been carefully and thoroughly done. In such cases the open method is much the safer and surer, as all other contracted tissues can thus be readily reached.

One of the first methods of elongating other than by simple division was suggested about six years ago by Dr. J. Neely Rhoads, of Philadelphia. It is done subcutaneously, and a knife (Fig. 1) for the pur-

FIG. 1.



Allis' knife for Rhoads' operation.

pose was devised by Dr. O. H. Allis, of Philadelphia. This knife has a long shank and a short blade with a curved cutting edge. The method of procedure is as follows. After puncturing the skin above the upper point of division, introduce the knife-blade flatly between the skin and the tendon, turn it, and cut through the middle of the tendon, longitudinally, for the required distance, then cut out at one side and withdraw the knife. Introduce it at the lower end of the longitudinal incision and cut off the opposite half of the tendon. Elongation can thus be accomplished and the ends be allowed to overlap for tendinous union. No sutures are employed, as the entire procedure is subcutaneous. Dr. Rhoads also suggested the use of this method in lengthening nerves and bones. Where but a small amount of lengthening is desired, he suggested (*Medical News*, November 28, 1891) cutting half through the tendon at different levels and from opposite sides, leaving some longitudinal fibres to slip on each other, thus gaining slight elongation.

Where lengthening of the tendon is desired, and splicing and tenotomy are inadvisable, Dr. F. Lange, of New York, suggests (*Medical News*, January 9, 1892) cutting the tendinous portion in the fleshy part of the muscle. The muscular fibres are easily stretched the desired length, and there is no risk of non-union of the tendon.

Mr. Anderson, of London, on October 18, 1889, devised and practised a method (*London Lancet*, July 2, 1891) of tendon elongation, which, though the tendon is incised similarly, differs from and excels Dr. Rhoads' method in being done openly and with sutures through

the severed ends. It also obtains a positive and definite increase in length, and perfect apposition of the severed ends. (Fig. 2, A, B, C.)



A, tendon split longitudinally; B, section completed by incisions at extremities of the fissure; C, divided tendon elongated and sutured. (Anderson's method.)

Dr. W. W. Keen, of Philadelphia, performed, independently, the same operation on November 29, 1890 (thirteen months after Mr. Anderson), and published it (four and a half months before Mr. An-

FIG. 3.



FIG. 4.



FIG. 5.

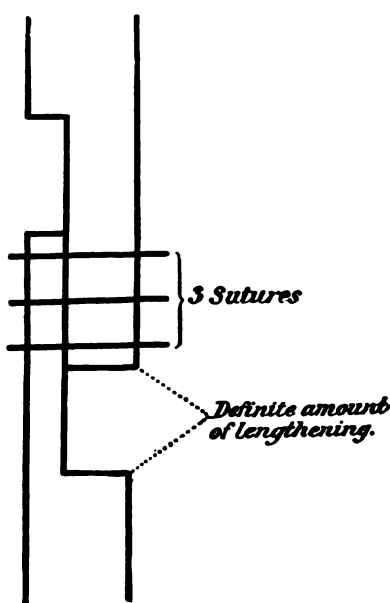


Diagram illustrating a new method of tenotomy, by which the tendons are lengthened to a definite extent, instead of the present hap-hazard method. (W. W. Keen, "Transactions of the College of Physicians," 1891, page 67.)

Fig. 3 shows the first or longitudinal section.

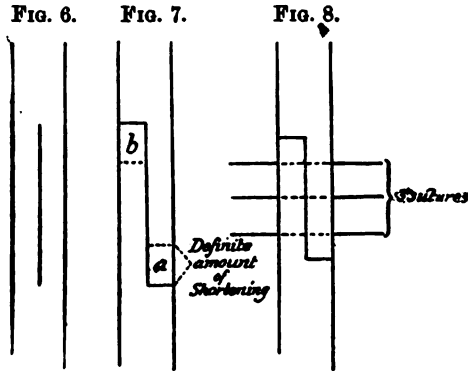
Fig. 4 shows the two transverse sections, each going through one-half of the tendon.

Fig. 5 illustrates the position of the sutures and the definite amount of lengthening.

derson's paper appeared) as an original method of obtaining positive and definite lengthening of a tendon; but upon learning of Mr. Anderson's priority in performing it, he resigned all claims of originality

in favor of the former. (Figs. 3, 4, and 5 are diagrams from Dr. Keen's article showing his results, and are exactly like Fig. 2, *A, B, C.*)

After the publication of this method of elongation, I suggested its use in shortening a tendon, and I have performed it with marked suc-



Wilson's adaptation of Anderson's method to shortening.

cess, the first occasion being on June 10, 1891. (*International Medical Magazine*, August, 1893.) The incisions are made in the same

FIG. 9.



Willetts' operation.

manner, sufficient tendon is removed from *a* (Fig. 7) to obtain the desired shortening, then a corresponding amount is removed from *b* (Fig. 7) for symmetry, and the ends are stitched, as shown in Fig. 8.

FIG. 10.

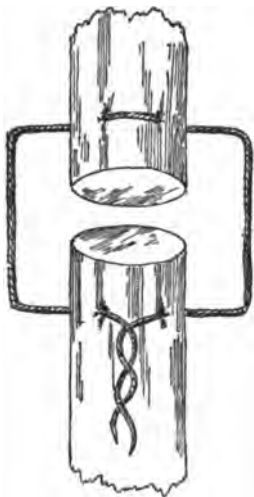


Esmarch's method. (After Roberts.)

Another method which has been adapted to lengthening or shortening is that of Mr. Willetts, of London. (*British Medical Journal*, May Vol. I. Ser. 4.—12

31 and June 14, 1884.) After the tendon has been exposed, it is cut diagonally from without inward and from below upward, the ends are allowed to slip past each other for the required distance, and are there held by two sutures on each side; if for shortening, the necessary amount is removed from one end and the oblique surfaces are brought together, as shown in Fig. 9.

FIG. 11.



Le Fort's method. (After Lejars.)

(Fig. 11.) This secures the tendon ends in the desired position, and prevents separation by muscular contraction, which frequently follows tenotomy.

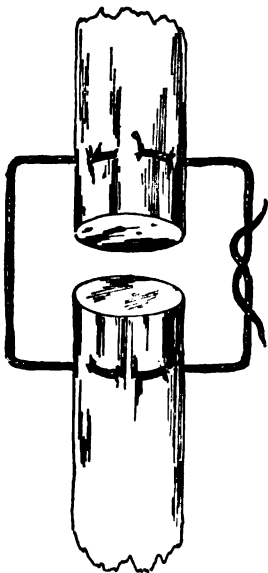
Wölfler's method (*Journal of the American Medical Association*, October 14, 1893) differs from the above in the suture's being passed in and out several times, partially encircling each end of the tendon, and in its being tied at the side. (Fig. 12.) The same end is accomplished as above, but the method illustrates, as do others I shall presently show you, the ingenuity of surgeons in attempting to obtain the same results.

Another method is that of Le Dentu. (*Journal of the American Medical Association*, October 14, 1893.) One suture, passed through each end, is tied at the side, and two supplementary sutures, one on each side of the tendon, are introduced nearer the ends, and at right angles to the first suture, as is shown in Fig. 13. These three methods, all very much alike, were originated about the same time by three different men, each ignorant of the other's plans.

About a year and a half after these were published, Dr. Trnka published a method which had been devised by him in 1887. (*Centralblatt für Chirurgie*, No. 12, p. 258, March 25, 1893.) It differs

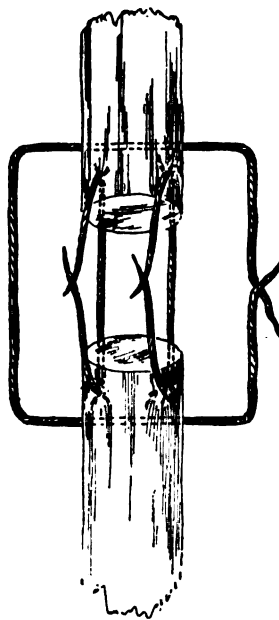
from those mentioned in the manner of inserting the suture. It is passed transversely through the anterior half of one end of the tendon and back through the posterior half, then in the same manner through the other end, loops being left on that side on which the suture is passed directly back through the tendon. (Fig. 14; an end view is shown in Fig. 15.) The free ends of the suture are tied, and the loops are connected by a separate suture (Fig. 16), and when drawn taut equal tension is made on each side of the tendon. (Fig. 17.) A simpler method of joining the loops does away with the extra suture.

FIG. 12.



Wölfler's method. (After Lejars.)

FIG. 13.



Le Dentu's method. (After Lejars.)

After the suture is passed through the one end, a long loop being left, it is passed through one side of the other end, through the first loop, and then back through the other side and tied. (Fig. 18.) This method secures firm apposition of the ends and aids very much in obtaining strong union. A method of lengthening has also been devised by him in which the upper end of the tendon is split from within three-eighths of an inch of the end upward the required distance, then cut out to one side, and this half turned downward to be joined to the lower end. In the same manner as the suture was introduced in the other, a suture is passed through the end which was split, the half turned downward

being included in the loop, then through the other end, including the connecting half, and then tied. (Fig. 19.) The half which was split out and turned over acts as the extra suture used in Fig. 17 or the joined loops in Fig. 18.

FIG. 14.

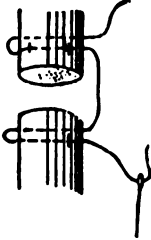


FIG. 15.

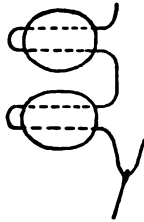


FIG. 16.

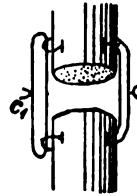


FIG. 17.

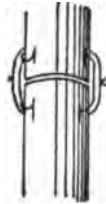


FIG. 18.

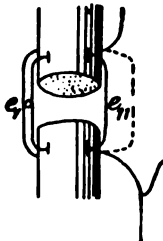


FIG. 19.



Reproduced from the *Centralblatt für Chirurgie*, No. 12, page 258, March 25, 1893.

Figs. 14 and 15 show the method of inserting the catgut suture so as to form the loop into which is to be engaged the connecting material.

Dr. Trnka emphasizes the importance of the loop *c*, as shown in Fig. 16. A simplification, for the sake of quick adjustment, is shown in Fig. 18. Instead of forming the loop *c*, in Fig. 16, any proper material may be inserted, such as catgut or a piece of the tendon itself, turned down as shown in Fig. 19.

When the catgut used is thin, it can be tied as in Fig. 16; but when it is heavy, it should be sewed fast to both ends of the divided tendon, in the same manner as shown in Fig. 19.

It is strongly urged that sutures through the tendon should not be drawn so tight as to cause the nutrition of the tissues to suffer.

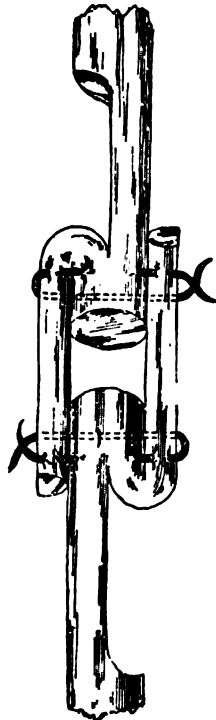
Some time ago I devised (and performed for the first time in September, 1893) a method which has the advantage over Trnka's of there being more tendinous tissue between the two severed ends and

consequently a stronger tendon after union. It is done by splitting both parts of the tendon equally for the required distance from within three-eighths of an inch of the end and cutting out to one side at the other end of the incision and at opposite sides of the tendon. Now turn over these cut halves and pass a suture through each one in the manner shown in Fig. 19, and tie each separately. The result is shown in Fig. 20.

Czerny (*Journal of the American Medical Association*, October 14, 1893) provided for strength by utilizing part of the tendon for the lengthening process, transplanting the end of the part cut from the side of one tendon end into the other free end, so that tendinous structure is secured through the entire course. (Fig. 21.) This method can be illustrated by placing one finger of one hand between two fingers of the other, the exact relation of the two tendon ends. They are held in place by through-and-through suturing.

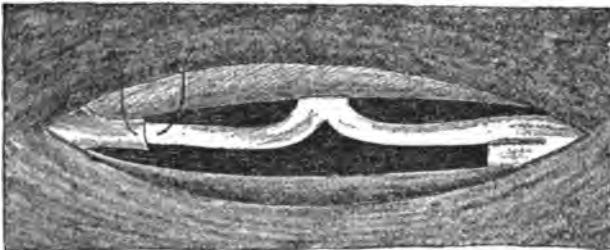
Schwartz (*Journal of the American Medical Association*, October 14, 1893) devised a method of anastomosis where junction of the two ends, for some reason, cannot be effected. He divides a neighboring tendon longitudinally, as in the extensors of the fingers, and cuts off one-half at the distal end of the incision, then attaches the distal end of the severed tendon to this freed end of the half of the neighboring tendon (Fig.

FIG. 20.



Wilson's method.

FIG. 21.

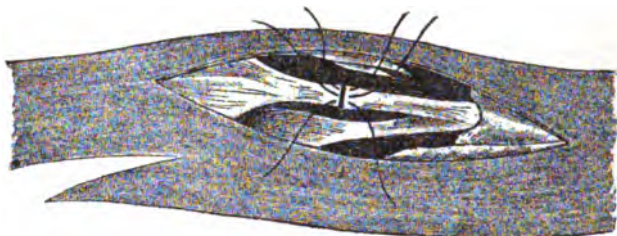


Czerny's method. (After Lejars.)

22), thus securing the movement of the two parts or members by means of the one muscular action.

The Tillaux and Duplay method (*Journal of the American Medical Association*, October 14, 1893) is a very ingenious one, accomplishing the same purpose as that of Schwartz. A longitudinal incision is made

FIG. 22.

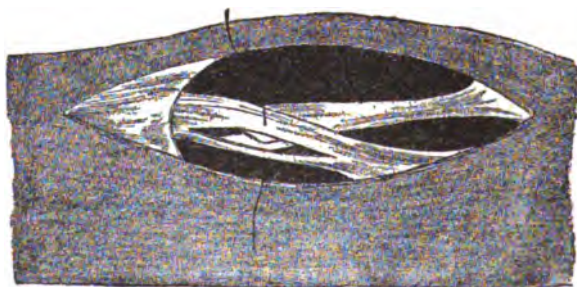


Schwartz's anastomosis. (After Lejars.)

through a contiguous tendon, and the distal end of the severed tendon inserted in it and sutured in position. Two members may thus be operated by one muscle, or two muscles, if the proximal end be inserted, may operate one member. (Fig. 23.)

These operations represent the principal ones for tendon splicing, lengthening, or shortening by division of the tendon in its entirety. Several complicated methods have been devised for the purpose of utilizing tendinous tissue in lengthening and yet not entirely dividing

FIG. 23.



Tillaux and Duplay method. (After Lejars.)

the tendon at any point. The originator of either plan is unknown to me. The first one is the more complicated of the two which I shall mention, and is done as follows. Divide the breadth of the tendon into fifths. From each side and at the same level cut transversely through two-fifths to the middle fifth, then longitudinally for the required distance. Then enter the knife at a point one-half inch below

the transverse cut on one side, and in the line separating the first and second fifths cut longitudinally a distance equal to the first longitudinal incisions, turn the knife and sever the middle three-fifths, turn it again and cut upward for the same distance as the parallel incisions. The last incision will embrace the first two between the longitudinal cuts, and the diagram of the incisions is seen in Fig. 24 A. When the tendon is drawn out to its limit of lengthening, it presents the appearance of Fig. 24 B. The amount of elongation is graduated by the length of the longitudinal incisions. The disadvantages of the

FIG. 24 A.



FIG. 24 B.



FIG. 25 A.



FIG. 25 B.



method are that the tendon must be a very broad one, and that a great degree of skill on the part of the operator is required to perform it, even in a large structure.

The other method which I shall show you is adapted to the same purpose, but is less complicated than the one just explained. The breadth of the tendon is divided into thirds, and longitudinal incisions of equal lengths, but at different levels, the right being the higher, are made between them. Then cut transversely through the left two-thirds to the upper end of the right longitudinal incision, and through the right two-thirds to the lower end of the left longitudinal incision,

as shown in Fig. 25 A. Draw on the tendon; it is elongated, is composed of tendinous structure through the entire length, and presents the shape seen in Fig. 25 B. In both these methods re-enforcement by sutures of that part of the tendon where the ends remain intact would be necessary. Both show considerable ingenuity on the part of the originator, yet lack that simplicity which is necessary for practical application.

There is a case this morning for the operation of lengthening the tendo Achillis, and, if suitable for the operation, I shall do Rhoads' subcutaneous elongation without sutures. The last operation of lengthening done before you was by the Anderson method. It was the fifty-fourth operation done by me by the open incision and suturing, and is the first one in which I have had suppuration. The cause of the suppuration I do not know. However, the wound is open and has been thoroughly cleansed of suppurative material, and is now doing very well. In this patient observe that about three-fourths of an inch of elongation must be obtained in order to secure correction of the existing equinus, yet there is sufficient length of tendon to allow of the operation and still leave tendinous surfaces in contact.

The long knife is introduced under the skin about two and a half inches above the heel. The tissues are found very firmly bound to the tendon, and quite extensive adhesions are present, showing that a cellulitis had formerly existed in the part. A point of abrasion exists about one and a half inches above the os calcis, which looks as though it had been a point of suppuration, and, if so, might account for the present condition of the structures. These circumstances make the expediency of Rhoads' operation very doubtful, and if, upon another trial, the knife cannot be easily introduced, I shall abandon it. The tissues are as firm in one part as in another, and the inflammatory action has been so wide-spread that I shall do simply a transverse tenotomy, largely because the parts have not been prepared aseptically, as required for all open wounds. After cutting the tendon, there is but a slight gap between the ends upon extension, because of the adhesive bands about the sheath. Having divided them, I shall apply carefully controlled force to separate the adhesion and secure correction. The amount of controlled force which can be applied to a part for correction depends upon the control. Considerable harm may be done by the application of unregulated power, but with judiciously employed force very great good can be accomplished. I can feel the adhesive bands give way each time I apply force, and you can see the foot yielding. Notice how easily it is now straightened, and that not en-

tirely by dividing the tendo Achillis, but partially by tearing loose the contracted peritendinous tissue. There is about three-fourths of an inch separation of the tendon ends now, the deformity is corrected, and the foot can be easily maintained in the corrected position. This case illustrates the fact that deformities do not always yield to simple tenotomy, but that other structures must sometimes be loosened.

It is not at all probable that full restoration of the function of the leg muscles in this boy can be accomplished, and therefore the aim will be to secure a good position, so that a suitable apparatus may be worn later. The foot will be placed at right angles to the leg, and plaster of Paris applied as a temporary retainer.

[NOTE.—One month later the patient walked firmly upon the foot with the assistance of a steel supporting apparatus. There had been an uninterrupted recovery, with firm union of the divided tendon.]

ACUTE PERIOSTITIS.

CLINICAL LECTURE DELIVERED AT ST. GEORGE'S HOSPITAL, LONDON.

BY WARRINGTON HAWARD, F.R.C.S. Eng.,

Surgeon to and Lecturer on Clinical Surgery at St. George's Hospital, etc.

GENTLEMEN,—The subject of my lecture to-day will be acute periostitis, and I have chosen this important disease because there have been recently in the hospital several cases illustrating some of its chief varieties, and some of these patients are still under our observation. I call acute periostitis an *important* disease, first, because of its comparatively frequent occurrence, and, secondly, because of its destructiveness to both life and limb, if not speedily arrested.

Of its frequency you have had many opportunities of judging, for scarcely a week passes without the admission of a case of this disease into our wards. And surely any disease which is of such frequent occurrence should have, therefore, for us the greatest interest, especially if it be, as in this instance, of serious gravity.

My second reason for regarding acute periostitis as an important disease is that if not recognized and checked at its outset it speedily brings the patient into a condition of serious danger, and, if not fatal to life, may rapidly cripple or destroy one or more of his limbs.

Let me first define for you what I mean by "acute periostitis." It is an inflammation of the fibrous covering of the bone, rapidly leading to a separation of the membrane from the surface of the bone, by the effusion of inflammatory products beneath it, and also to the obstruction of the periosteal vessels on which the nutrition of the bone largely depends.

It is usual to distinguish two kinds of acute periostitis, the simple and the diffuse,—a convenient division, though not always easily made at the outset of the disease. By *simple acute periostitis* is meant an acute inflammation of the periosteum which, though rapidly leading to the formation of matter, is soon limited to a comparatively small area from its point of commencement. It may occur in apparently healthy

persons, though it is more often seen in those of depressed vitality or who have been debilitated by recent zymotic disease. The symptoms are these. The patient, probably a young person somewhat out of health, receives a blow on one of the more prominent bones. Next day the bone aches severely, the pain being increased by the use of the limb or its dependent position, the temperature rises, and by the second or third night is probably 101° or 102° . The limb now feels hot, and there is acute tenderness over the seat of injury, with a limited elastic swelling upon the bone, and perhaps a blush of redness over the corresponding area of skin. Under appropriate treatment these symptoms may subside without suppuration; otherwise the pain increases, matter forms beneath the periosteum and eventually makes its way to the surface, its escape being followed by a subsidence of the pain and fever, and subsequently probably by the separation of a thin fragment of the outer layer of the bone, the healing of the sinus, and the recovery of the patient.

Such a case you have recently seen in M. J., aged nineteen, an overworked and underfed general servant, who was admitted into the hospital three days after a slight blow on the upper and inner part of the tibia. She complained of great pain and tenderness over this part of the bone, where there was an elastic swelling about three inches long, the skin over which was oedematous and red. Her temperature was 102° , her pulse 120. The limb was placed on a splint, and an incision made without delay through the swelling down to the surface of the tibia, the periosteum being freely divided. An escape of blood-tinged serum occurred, but no pus had formed. Hot boracic dressings were applied, and quinine was given internally. Immediate relief of the symptoms followed, and the girl made a good recovery. In this case the proximity of the swelling to the knee-joint, and the decided evidence of fluid beneath the periosteum, made it desirable to cut down upon the bone without delay; and as, happily, pus had not yet formed, the case came speedily to a good end without any necrosis.

In the early stages of this disease the inflammation may often be cut short by the application of a few leeches, followed by some soothing application, such as a lotion of lead and opium, applied hot and frequently renewed. The limb should of course be kept entirely at rest upon a splint or pillow, and be well raised. The pain in these cases varies greatly with the position of the limb, and is much relieved by keeping the affected part elevated and quiet. Do not, however, neglect the general treatment: the patients are often out of health, and are usually constipated. An aperient therefore may be desirable, and

this may be followed by cinchona and mineral acids, or quinine. Stimulants are best avoided: they increase the pain.

The patient to whom I have referred was notably benefited by the rest, good food, and tonics, as well as by the local treatment.

If, however, in spite of such care, or through the lack of it, the inflammation persists, and fluctuation can be felt in the swelling, an incision should be made without delay, and this incision should divide the periosteum freely. If the fluid has not yet become purulent, so much the better; but in any case a drainage-tube should be inserted, so as to insure the escape of whatever exudation may occur.

Sometimes such periostitis is a manifestation of a chronic form of pyæmia. The pyæmia is chronic, but the periostitis is acute. Many of you have seen a girl (L. K., now about fourteen years old) who has been frequently under my care during the last five years, in whom a great number of the bones have been affected with acute periostitis. In this form of pyæmia, as Sir James Paget has pointed out, the same tissue is apt to be selected by the inflammatory process through the whole course of the disease. This child has had both thigh-bones, both tibiæ, the bones of the arms and forearms, and one wrist affected at different times. She becomes feverish, a bone is painful, and in a few hours a periosteal abscess forms, which may reach a considerable size. On one occasion, before the abscess could be opened, the pus made its way into the intermuscular cellular tissue of the thigh and there formed an immense collection. A most remarkable feature of this case is the anæmia which rapidly ensues on every periosteal attack: the child can be seen to become daily more pallid, and after the healing of the abscess gradually regains her color. I have frequently seen and called your attention to the occurrence of this anæmia in such cases, but in no instance has it been so marked as in this child.

Other examples of pyæmic periostitis are seen after fevers, especially typhoid fever, in which the ribs are peculiarly liable to be the seat of the disease. This form of periostitis in connection with fevers usually ends in recovery after the exfoliation of a thin layer of bone. I would remind you that a syphilitic node—i.e., a localized syphilitic periostitis—may sometimes be acute and very painful, and that acute periosteal swellings are occasionally seen in connection with rheumatism.

You see, however, that the form of acute periostitis which I have hitherto spoken of, though locally damaging, painful, and disturbing, is not a disease of any special gravity, and it presents a marked contrast to the diffuse form, of which I shall next speak. This disease,

known as "*acute diffuse periostitis*," and sometimes, on account of its common termination, as "*acute necrosis*," is a serious and dangerous affection, the issue of which will largely depend upon its early recognition and efficient treatment. Every case of it which you have an opportunity of seeing is worthy of your careful examination and study.

Now, one important characteristic of this disease is that it attacks almost exclusively the young. It is most commonly met with between the ages of ten and fifteen, and more often in boys than in girls. In the majority of cases an injury, often quite a trivial one, seems to have started the inflammatory process; and this may account for its more frequent occurrence in boys, who are more exposed to injury than girls. In some cases, however, no traumatic origin can be discovered. As in the less serious form of periostitis which I first spoke of, the disease selects usually those who are out of health or who are living under unfavorable conditions.

Of those cases lately under our observation, No. 1 was a boy of fourteen years, who lived over a stable. He was in miserable condition, depressed, pale, and ill nourished, and a week before admission had received a blow on the affected bone (the femur); No. 2 was a boy of ten years, also very pale and thin, who lived in a very poor and crowded neighborhood, and who three days before had fallen and hurt the affected limb; No. 3 was a girl nine years of age, who came from an industrial school, of the sanitary state of which we had no knowledge, but she was a delicate, pale, and thin child, and she also had a week previously received a slight injury to the affected tibia.

The symptoms are at first those of fever,—rigors, vomiting, raised temperature; these are soon followed by local pain, generally over one of the long bones of the lower limb; a few hours later there will be found great tenderness to pressure over the bone, and perhaps some deep swelling may be felt; then effusion occurs in one or both of the joints belonging to the bone, the temperature continues to rise, reaching 103° or 104°, fresh rigors occur, and profuse sweating; a little later the whole limb becomes swollen and intensely painful, the skin being more often pallid than red. If free incision upon the bone has not now been made, matter makes its way along the limb and towards the surface, as well as perhaps into one of the adjacent joints; pyæmic symptoms (*e.g.*, pleurisy, pericarditis, pneumonia) probably ensue, and the case in a few days is likely to come to a fatal end.

In some instances pyæmia occurs within a few hours of the commencement of the inflammatory process, and before there has been an opportunity for surgical interference; in other and less severe cases,

when the matter has been let out or has made its way to the surface, the fever abates, and the symptoms are chiefly connected with the suppuration and consequent necrosis. The symptoms in Case No. 1 were typical, and I will briefly relate them; those of the other two cases so closely resembled them that I need not give them in detail.

The boy, who was aged fourteen years, and was weak, pale, and thin, lived over a stable; a week before admission he received a blow on the left thigh. The next day he was feverish and ill; he shivered and vomited and took to his bed. On the third day he had great pain in the left thigh, and on the fourth day the left hip- and knee-joints became swollen and painful. When admitted he looked very ill. Temperature, 103°. Pulse, 120. Tongue dry and brown. Urine 1020, depositing lithates; no albumin. Heart and lungs natural. There was great tenderness along the whole shaft of the left femur, effusion in the corresponding hip- and knee-joints, and intense pain in the whole thigh. There was no swelling of the thigh, except slight œdema near the knee, nor could any deep fluctuation be detected. An incision was made through the periosteum down to the bone on the outer side of the femur, and exit given to several ounces of sero-purulent fluid. The outer two-thirds of the femur were felt to be separated from the periosteum for several inches, both upward and downward from the incision. A drainage-tube was inserted and an antiseptic dressing applied. Quinine, port wine, and nourishing food were administered freely. Next day the temperature had come down to 101°, and the boy was much easier. On the fifth day after admission the temperature was 100°, and from this time the symptoms subsided, the incision eventually healing without any separation of bone.

Case No. 2 was an almost exact counterpart of No. 1, except that when the femur was cut down upon no pus was found, but the periosteum was extensively separated from the bone by inflammatory exudation. On the eighth day from admission a large abscess rapidly formed in the deep intermuscular cellular tissue over the inner side of the lower half of the thigh, whence a large quantity of septic pus was evacuated by incision. A counter-opening was made, and the abscess-cavity thoroughly drained and cleansed. From this time the boy went on well, and at the end of three months the incision had healed, and the boy, though still anæmic, was well enough to go to the convalescent hospital. No bone separated, but there remained great periosteal thickening over the lower third of the femur, and a little stiffness of the knee-joint. Almost the same description would apply to the case of the girl (No. 3), only that the bone affected in her

case was the tibia. As was seen in these cases, the disease may be sometimes arrested by timely incision, and hence an early and correct diagnosis is of the greatest importance, though I shall relate presently a case which nevertheless came to a fatal end. Now, the diagnosis at the outset is not always easy, and a great many of the cases are sent to the hospital as acute rheumatism. The reason of this mistake is that the patient has rigors, sweating, and high temperature, and perhaps one or more swollen joints; he may have, besides, pericarditis: all of which looks rather like acute rheumatism. But note the points of difference. In the first place, acute rheumatism affects several joints, whereas, if there be effusion in more than one joint in acute periostitis, you will observe that only the joints at either end of the painful bone are affected. Then you will also note that the pain and tenderness are much more marked over the shaft of the bone than over the joints. Moreover, though the urine may be concentrated and contain abundant lithates, there is not the acid urine and sweat of rheumatism. The tongue, which in rheumatism is coated with a thick white and moist fur, is in periostitis dry and brown.

If, therefore, you see a boy or a girl about the age of puberty very ill with rigors, high temperature, and swelling of *one* joint, or of the *two joints only which are at either end of a long bone*, examine most carefully the long bone to which that swollen joint belongs, for you may be nearly sure that it is not rheumatism you have to deal with, but most probably a case of acute periostitis.

The only other disease for which the periostitis is likely to be mistaken is diffuse cellulitis. From subcutaneous cellulitis the diagnosis will not be difficult, for in that condition there will probably be a wound as a starting-point; the skin and lymphatics will usually be to some extent involved; the area of inflammation will not correspond to the limits of one of the long bones, but will extend along the subcutaneous tissue without regard to the adjacent joints. Besides these distinctions, if the case has been observed from the commencement, it will be noticed that in periostitis pain and deep tenderness precede obvious swelling. From cellulitis affecting the deeply situated planes of intermuscular connective tissue the diagnosis may be at first more difficult; but here again the limitation of the area of the disease in periostitis will help us, and in deep cellulitis there will be in most cases the originating wound, and swelling of the limb will be more early apparent. Should, however, the decision between these two diseases be difficult, an exploratory incision will not only be justifiable for diagnosis, but will be in either condition beneficial as treatment.

One serious danger of acute periostitis is that pyæmia may occur almost at the very commencement of the attack. It is this complication which brings many of the fatal cases to a rapid end. The pyæmia is usually of a severe type, and there is a special liability of the heart and kidneys to secondary deposits.

I will briefly relate a case illustrating this point. Elizabeth C., eight years of age, was admitted into the hospital with extreme pain in the right leg, which was swollen from the knee to the ankle. There was no effusion in either of these joints, but careful examination revealed not only superficial œdema, but deep swelling over the shaft of the tibia. The child looked very ill: the temperature was 104° , and the pulse and breathing very rapid. The history was that a week before admission she fell down-stairs and struck the right leg, that the following day she was ill and had great pain in the leg, that swelling of the limb gradually ensued, and that the day before admission she had had some sort of convulsion.

An incision was at once made over and down to the shaft of the tibia, a quantity of pus let out, and the shaft of the bone felt to be completely bare. Although the incision gave great relief to the pain, the general condition of the child did not materially improve. She had severe pain in the right humerus, and also in the back. Diarrhœa and hæmaturia occurred at intervals, and she died on the tenth day from her admission.

Post-Mortem.—The diaphysis of the tibia was found to be completely necrosed, the periosteum was completely stripped by suppuration from the shaft of the bone, the lower epiphysis was separated from the diaphysis, and there was commencing myelitis at that end of the shaft; the adjacent joints were natural. There were numerous small pyæmic abscesses scattered throughout the substance and on the surface of both lungs. There was turbid fluid in the left pleura. The pericardium was natural; but there were two abscesses in the tricuspid valve, one of which had ruptured and was surrounded by exuberant granulations. The left side of the heart was natural. The liver was natural. The spleen was soft and contained several embolic infarcts. The pancreas was natural. The suprarenal bodies both contained patches of embolic hemorrhage. There were numerous small hemorrhagic infarcts in both kidneys. In this case the post-mortem examination showed that the pyæmia must have begun quite early in the disease, and you see that both the heart and the kidneys were the seat of secondary deposits.

In another example of pyæmia in connection with acute periostitis

of the femur which I saw a short time since, there was suppuration of the sterno-clavicular joint, and of one of the interphalangeal joints of a finger on each hand. This patient, after passing through many dangers, eventually recovered.

Concerning the causes of acute diffuse periostitis our knowledge is still incomplete. There certainly seems good reason to suspect the invasion of a specific bacillus. But this at least we know, that it is usually met with in persons living under unhealthy conditions: so that it is obviously our duty when called to a case of this disease to seek for any such conditions in the dwelling or surroundings of the patient. The disease is not confined to the poor, and you may often discover serious unsanitary defects in the houses of the wealthy, where more attention has perhaps been given to the decorations than to the drains.

When the inflammatory process is once started, exudation occurs with great rapidity between the periosteum and the bone: this exudation quickly becomes purulent, and, having no escape, spreads along the surface of the bone, stripping off the periosteum, closing the periosteal blood-vessels, and cutting off a great part of the blood-supply to the bone. The disease most commonly starts on the shaft of a long bone, and if unchecked rapidly spreads to the epiphyses, by which it is often limited. Suppuration may, however, pass the epiphyses and extend to the neighboring joints; or it may begin in the epiphyses and spread to the shaft or the joint. In the more virulent cases the inflammation extends from the periosteum to and along the marrow of the bone, and necrosis of the bone speedily ensues. Some pathologists, especially those of the French school, maintain that when acute necrosis occurs there is always osteo-myelitis as well as periostitis; but though this is often it is not always the case. Necrosis of the entire diaphysis of a long bone may be seen a few days after the commencement of an attack of acute diffuse periostitis in which there is no evidence whatever of any affection of the medulla. Sometimes, as after amputation, the medulla is the part chiefly affected, and the inflammation extends to a greater distance along the interior than along the exterior of the bone. If early incision be made through the periosteum, the attack may end with only a limited and superficial necrosis; in other cases there is no necrosis, but the periosteum is left more or less thickened.

The disease selects, as a rule, the long bones, especially these of the lower extremity. I have on various occasions removed for acute necrosis more or less of the shaft of most of the long bones of the

body,—viz., part of the shaft of the femur, part of the humerus (on a recent occasion the upper third of the shaft and the head of the bone), the entire diaphysis of the tibia, of the fibula, of the radius, of the ulna, and of the clavicle. If the patient survive, and the necrosed bone be removed, excellent repair occurs, and the dead bone may be almost completely reproduced.

We now come to the *treatment* of the affection; and I know of no disease in which prompt and active surgery is more urgently called for. It is for this reason that I have said so much upon the diagnosis; for as soon as you have satisfied yourself that you have to deal with a case of acute diffuse periostitis you should cut down upon the bone. A sufficiently free incision should be made through the soft parts over the most tender part of the bone to enable you to pass your finger an inch or more along the periosteum. Then you should cut firmly upon the bone, taking care to divide the periosteum thoroughly. Do not wait for evidence of suppuration: the best chance of arresting the disease is to incise the periosteum before the exudation between the periosteum and the bone has become purulent. If, however, matter has formed, the incision may have to be more extensive, and if pus has made its way along the deep planes of connective tissue, counter-openings for drainage will probably be needful. When suppuration has occurred the pus must be thoroughly syringed out with an antiseptic solution, and the limb enveloped in antiseptic dressings. Daily careful examination of the limb must be made, to insure the free escape of inflammatory products. Large collections of pus sometimes form with extraordinary rapidity in the deeper cellular planes, and must be treated by incision and drainage. Quinine and opium should be freely given, as well as a supporting diet, and whatever stimulant seems needful. If necrosis occurs of the entire diaphysis of a long bone, early removal of the dead bone is desirable, and should be practised as soon as it is easily separable from the epiphyses and as the condition of the patient permits. Care must then be taken to maintain the length of the limb, and to keep it at rest in such a position as may best allow of a satisfactory regeneration of the bone. In cases of acute necrosis wherein the suppuration has spread to one of the large joints, and in which the condition of the patient is severely depressed, it may be necessary to amputate the limb, and thus at once rid the patient of a severe drain and a source of constitutional irritation or septic absorption.

Young people suffering from this disease will be observed to become extremely anæmic and to lose flesh very rapidly; it is necessary, therefore, during recovery to feed them carefully and well, in

addition to which mild preparations of iron will generally be useful. But better than any medicine is the restorative effect of sunlight and fresh air. When, therefore, circumstances do not permit of the patient being sent into the country, great attention should be paid to the ventilation of his room ; and much good may be done by placing him in that part of the house into which the direct rays of the sun most freely enter.

**ENTERECTOMY AND THE FORMATION OF AN
ARTIFICIAL ANUS IN A PATIENT UPON WHOM
CÆLIOTOMY WAS PERFORMED FOUR TIMES;
REST IN THE TREATMENT OF RECTAL PRO-
LAPSE, AFTER THE FORMATION OF AN ARTI-
FICIAL ANUS.**

CLINICAL LECTURE DELIVERED AT BELLEVUE HOSPITAL.

BY JOSEPH D. BRYANT, M.D.,

Professor of Anatomy and Clinical Surgery, and Associate Professor of Orthopædic Surgery, in the Bellevue Hospital Medical College, New York City, New York.

GENTLEMEN,—The first case which I shall show you to-day has been a puzzle to us at times, on account of the personal peculiarities the patient has frequently displayed. This patient is illustrative of four distinct, full-fledged cœliotomies, besides two other penetrating incisions which cannot be dignified by the use of this expression. The first cœliotomy was done several years ago, and by Kocher, according to the patient's statement. For what exact purpose it was then performed one can only conjecture, but presumably it was for the relief of suspected intestinal obstruction, since when she was seen first by me she had many of the symptoms of this condition. The second operation was performed through the cicatrix of the first one by a surgeon in Connecticut, whose name the patient does not recall. As the patient has never complained of other symptoms than those quite easily attributable to intestinal obstruction, I believe that the reason for the second operation can also be based on this assumption. The third operation was done in the City (Charity) Hospital of New York by an able surgeon, Dr. Norris, only a few years ago, and the necessity for it was based on a similar belief. The fourth was performed by myself about two years ago in Bellevue Hospital, at the site of the preceding ones, for the cure of what was then supposed to be a fistulous communication between the transverse colon and the stomach. The belief in this condition was founded on the fact that when coloring waters and fluid

food were injected into the rectum they were soon discharged from the mouth, attended with vomiting. It should be said that the amount of time was not given to the personal consideration of this case that should have been, as she was committed to my care with the diagnosis already suggested. However, as was suspected, she did not have a fistulous communication. The symptoms already stated were self-imposed by means of the concealment in her mouth, when unobserved, of the material which, when expectorated at the proper time for deception, easily accomplished the purpose.

She possessed the ability of increasing the rectal temperature at will, but in what manner I could not ascertain. A rectal temperature of 110° was exhibited, although it was evident that elsewhere it was scarcely above the normal figure. She asserted that she could take no nourishment by the mouth, which appeared reasonable in the face of the fact of the occasional vomiting of fecal matter. However, inasmuch as but little physical deterioration and general disturbance were noticeable, it was thought she was practising a subtle deception in some manner regarding nourishment. After a little she was placed under strict surveillance and allowed no food whatever. The pangs of hunger soon forced a confession that she had been given food at night by the ward attendants, and had secured it herself, even, while others slumbered. As a sequel of the fourth cœliotomy a fecal fistula developed in the umbilical region, caused by a limited sloughing of the transverse colon at that point. A complete history of this most interesting case of hysteria is published in the *Medical Record* of October 7, 1892.

While I am not certain of the cause of this sloughing, still, I regard it as dependent on undue exposure of the free surface of the gut, caused by the separation of the adhesions that existed intimately between the transverse colon and the anterior surface of the stomach during the search there for the suspected fistula. Great care was exercised in this respect, and no evidence of denudation was observed at that time. About one year ago I dissected out the fistula, and closed the consequent opening into the colon in the usual manner, hoping to secure primary union. The attempt failed, dependent, as was supposed at the time, on the efforts of the patient to remove the dressings. At a later period I again exposed the opening, and, owing to the undue narrowing that would have resulted from another simple longitudinal enterorrhaphy, the opening in the bowel was extended on either side along the free surface for about two inches, and then closed entirely by the "elbowing" process.

I will explain this method to you. Let us, for the purpose of the

explanation, tie this string tightly around my extended arm, at the seat of the elbow. Of course it is apparent that it causes a constriction there, diminishing considerably the transverse diameter at that point. If an incision be now made along the anterior surface of the arm four or five inches in length, its centre corresponding to the constricted point, through the textile fabrics down to the integument, it is plain that the string (stricture) will be divided. I will now flex the forearm sufficiently to permit the distal extremities of the incision in the fabrics to be properly united with each other, and while in this position will sew securely to each other the opposed divided borders at either side of the opening. If we now substitute the colon for the arm, divide it longitudinally in a manner similar to that in which the textile fabrics are divided, flex the colon on itself at the centre of the incision, and sew the borders to each other, the gut is then "elbowed."

This attempt failed also, and, in my opinion, for two reasons: 1. The occurrence of a severe diarrhoea, which was persistent, notwithstanding proper treatment. 2. The absence of suitable peritoneal surfaces at the sewed borders. You should be told now that the previous peritonitis excited by the numerous operations had been followed by entire loss of the glistening surface of the peritoneum, not only of the transverse colon, but of all the small intestines under observation. Adhesions everywhere between the intestines were substituted for normal tissue. This condition robbed the tissues of the intestine largely of the inherent tendency they possess to unite quickly, and likewise so lessened the activity of the nutritive processes of the wall of the bowel, through interference with the circulation, as to hinder union.

The next effort at cure was directed to turning aside the fecal current, in order that the colon might be at rest while undergoing repair. To meet this end an artificial anus was made on the right side, connected with the cæcum. It was hoped that the discharge of the fecal matter through this opening would lead to spontaneous closure of the fistula, and that it would remain healed after closure of the artificial anus. At any rate, the presence of the artificial opening in the cæcum was deemed necessary for the safety of the patient in the event of the performance of enterectomy, or even the use of the enterotome for the removal of the constricted portion of the colon. It was believed that prompt union of the divided tissues would be hindered by the changes in them induced by the inflammation that had followed previous operations. Moreover, the passage of fecal matter through the united gut under these circumstances could not but be highly objectionable and

even dangerous. At once, after the establishment of the artificial anus, the old sinus communicating with the colon began to close, and soon healed entirely, notwithstanding only the lesser portion of the fecal matter escaped by the new opening.

It is in this condition that the patient is now presented to your notice. What can be done to relieve her, and what are the prospects of success? The removal of the intestinal constriction is the urgent indication. If this be done, then the artificial opening will soon close of its own accord. It is estimated that a diminution of one-fourth the transverse diameter of an intestine is not inconsistent with the proper performance of its functions. In this instance a careful measurement of the gut at the time of the first operation established the fact that three-fourths of the normal diameter remained unaffected by the closure of the fistula.

In view of these facts, I have determined to close the artificial opening and await developments. If this course be not adopted, enterectomy with end-to-end-union, division of the intestine at the seat of the narrowing with lateral anastomosis, or the employment of the enterotome, offer the only practical measures of cure. The danger attending either of these acts is so much greater than the simple measure of closure as fully to justify this course, especially since, in case of failure, by reopening the old sinus one can begin over again with but little danger to the life of the patient.

[NOTE.—At the end of a week after the closure of the artificial anus the patient suffered from severe pain at the seat of the old fistula, attended with a small, painful, tender, deep-seated induration at the same site, which was not influenced by large high enemata.

At the end of two weeks the old sinus opened, but of less diameter than formerly. During this entire time the patient's bowels moved freely only with the aid of cathartics or enemata; otherwise nothing unusual was observed. I now intend to re-establish the artificial anus and employ the enterotome for the purpose of cure, as this is believed to offer the safer plan of procedure. Enterectomy with end-to-end union is regarded as unsafe, owing to the loss of normal peritoneal surface and the presence of dense adhesions. Lateral anastomosis is thought to be impossible, on account of the firm adhesions that confine the transverse colon its entire length.]

The second case is one exhibiting the influence of "physiological rest" on an obstinate prolapse of the rectum which had been already subjected to many well-recognized methods of treatment of an operative nature without a resulting benefit of any kind, through the medium

of an artificial anus. The artificial anus was established with the sigmoid flexure three months ago. At present the following improvements are distinctly appreciable. (1) Pain and tenesmus have nearly disappeared. (2) Mucous and bloody discharges are arrested. (3) The prolapse is scarcely more than one-half its previous dimensions. (4) The sphincter ani is fast gaining tone; before this it was entirely paralyzed. (5) The patient's physical condition is now all that could be wished, and he expresses himself as being comfortable in any posture. About three-fourths only of the alvine matter escape through the artificial opening, the remainder passing by the rectum, aided by small enemata.

I shall continue to observe this patient until the fullest benefits of the measure are thought to be experienced. Please remember that this measure is contemplated only for the worst forms of otherwise irremediable prolapse, the only other remedial measure being amputation of the protrusion.

FORCIBLE REDUCTION OF UNREDUCED FRACTURE AT THE LOWER END OF THE RADIUS, FOUR MONTHS AFTER THE ORIGINAL INJURY, IN TWO PATIENTS, ONE OF THEM AGED SEVENTY-FIVE YEARS; CURE IN BOTH CASES.

CLINICAL LECTURE DELIVERED AT THE WOMAN'S HOSPITAL OF PHILADELPHIA.

BY JOHN B. ROBERTS, A.M., M.D.,

Professor of Surgery in the Woman's Medical College of Pennsylvania.

I NOW show you what may be gained by aggressive surgery in maltreated fractures of the lower end of the radius. This woman, aged seventy-five years, had a fall from some steps, over four months previously to coming to the clinic, which caused the ordinary fracture of the base of the right radius. She was treated by a physician, but since that time had suffered much pain. The deformity of the wrist, when I first saw her, was considerable, and there was stiffness of the fingers. The finger-joints of both hands were somewhat enlarged with the deposit which occurs in rheumatoid arthritis. The patient's general condition was good, except that she had a chronic leg-ulcer.

Examination of the wrist showed marked backward displacement of the lower fragment, giving the characteristic deformity which is so often seen in such fractures immediately after injury. It was evident, therefore, that the fracture had not been reduced, but was treated as these fractures often are, by a splint, without the fragments being put in apposition.

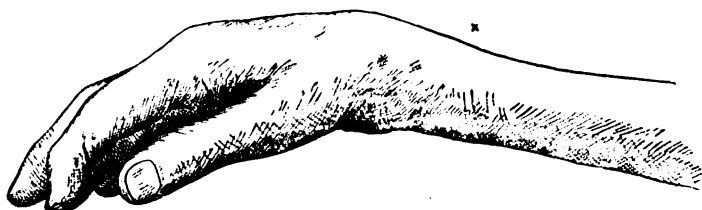
A little over four months after the date of the original injury, I refractured the maltreated bone and reduced the lower fragment with comparatively little difficulty. This operation was done under ether, before the class, and the bone fractured at the original seat of the injury by forcible hyperextension of the hand. A straight splint, made of a narrow piece of board, was then put upon the posterior aspect of the wrist and hand. This was worn for a few days, and subsequently

replaced by a band of adhesive plaster placed about the wrist as a sort of wristlet.

At the end of thirteen days all dressings were removed and the anatomical outline of the wrist was found to be restored. The patient stated that she had suffered less pain than before the operation of refracture. Massage and friction with oleaginous preparations were kept up for some time, after which treatment the patient rapidly regained the normal functions of the wrist and fingers.

These photographs, taken before and some weeks subsequent to the operation, show the difference in the limb made by the replacement of the lower fragment, which had been so long allowed to be unreduced.

FIG. 1.

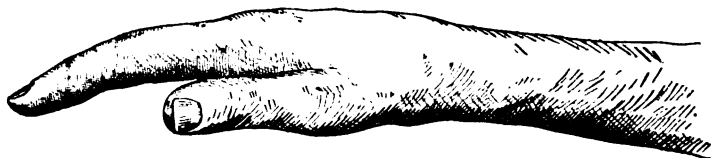


Deformity from unreduced fracture of the lower end of the radius. (The x shows the point where the unreduced lower fragment made an easily felt elevation or ridge on the dorsal surface of the radius.)

If you will examine the wrist as she passes before you, you will find that the contour of the dorsal surface of the radius is almost identical with that of the uninjured arm. When she first came here there was a distinct shelf or ridge felt at the point where the fracture had occurred.

This bone, as I have often told you, is usually broken about half an inch above the radio-carpal joint. The line of fracture is nearly

FIG. 2.



Restoration of contour after refracture. Observe that the dorsum of the radius shows no upward projection of bone.

always transverse and the fragments impacted. The essential of treatment is the forcible reduction of the lower fragment, which should

be pressed into place by your thumb, while you make extension and counter-extension accompanied by sudden flexion of the wrist. This procedure is exceedingly painful to the patient, but is done in a moment. I seldom give ether, since it is accomplished by a sudden movement of my hands, before the patient has time to think. By all means give an anæsthetic if you have not courage to reduce the fracture properly without such an adjunct.

After reduction there is little tendency to displacement, and a narrow and short straight splint on the back of the wrist, or a simple wristlet of adhesive plaster applied around the wrist, is all that is required in the way of fracture dressing. These fractures are often improperly treated because the reduction is neglected; hence pain and rigidity of the fingers remain for many weeks or months. It is one of the easiest fractures to treat satisfactorily if it is managed with energy at the beginning and with common sense afterwards.

It is unfortunate that the name of Colles is still associated with fractures of the base of the radius. Such personal nomenclature is always objectionable, and is especially so here, since Colles placed the seat of lesion at a higher point than that at which fractures of the base of the radius usually occur.

Clinically, fractures of the lower end of the radius vary very little in essential details. The amount of displacement, comminution, and impaction is not always the same, but through all the variations due to the degree and continuance of the vulnerating force, the surgeon sees the same essential lesion, situated at nearly the same point of the bone. The treatment, too, needs little variation, and consists in immediate forcible reduction.

The usual line of fracture is situated at from one-third to three-quarters of an inch above the articular surface of the bone, and is generally more or less transverse in direction, though some tendency to lateral or antero-posterior obliquity is not infrequent. Displacement of the lower fragment backward upon the lower end of the upper fragment is the ordinary deformity, and is due to the fracturing force, not to muscular contraction. Some impaction is not unusual from driving of the dorsal wall of the upper into the cancellated structure of the lower fragment, and actual loss of substance from crushing of the bone tissue is not infrequent. When true impaction does not exist, entanglement of the fragments by interlocking of the irregular surfaces is very common. Sometimes there is no displacement, at other times it occurs at the radial but not at the ulnar side of the lower fragment, which is tilted obliquely backward. The styloid process of the radius is carried

upward and backward by this displacement, and therefore the radial styloid process is often as high as, or even higher (that is, farther from the hand) than, the ulnar styloid process. This angular displacement tends to throw the articular surface with the attached carpus upward, backward, and to the radial side, and produces the peculiar deformity so recognizable. Sometimes the integument over the ulnar head is torn asunder by this radial displacement of the hand, and the ulna may even protrude through the laceration. Such a wound by no means implies an open or compound fracture of the radius, for frequently the wound has no communication with the fractured surfaces. I some months ago presented a case to the class where the skin over the ulna was thus torn.

The fracture just described, with or without comminution of the inferior fragments, is the one usually seen. Associated fracture of the lower end of the ulna or of the ulnar styloid process, synchronous rupture of the radio-ulnar ligaments, or epiphyseal fracture, may, however, occur.

Fracture of the lower end of the radius, with forward displacement, occurs, but is very rare. Dislocation of the carpus backward or forward is rare. Fracture such as this woman had is quite often supposed to be a dislocation.

Fractures identical in pathology and deformity with those found clinically can readily be produced in the surgical laboratory by sudden hyperextension of the hand caused by heavy blows. As there is no opportunity for living muscles to assist in the production or maintenance of deformity in such cases, it is reasonable to suppose that muscular action has little influence upon the similar fracture in living patients. The tonic contraction of the muscles of the forearm may be an agent in holding the fragments in their abnormal position when there is simple entanglement of the rough surfaces without true impaction, and the tendons may similarly cause the normal relations to be maintained after reduction by the surgeon. Further than this, muscular influences are unimportant, if my experience has taught me correctly. The conditions in a transverse fracture of the broad base of the radius are very different from those in an oblique fracture of the shaft above, which is surrounded by muscular bellies. The statement that there is a great tendency to displacement from muscular action after reduction has been accomplished is unconfirmed by clinical observation.

That reduction is at times impossible may be true, but I have never seen a recent fracture of the base of the radius which the power of my hands, aided by leverage across my knee, could not reduce under anæ-

thesia. *Reduction is to be accomplished by force, not by gentle pressure and manipulation, as some would have us believe.* I usually accomplish it by extension and counter-extension applied to hand and forearm, aided by sudden flexion of the wrist with simultaneous pressure on the dorsum of the lower fragment. This manœuvre is repeated, if necessary, until I feel no edge of bone at the seat of fracture, when I carry my forefinger or thumb along the dorsal surface of the lower third of the radius. The work is so quickly done that anæsthesia is generally omitted. In recent cases this is usually sufficient, but in unreduced cases of several weeks' duration, and sometimes in recent cases, I have been obliged to bend the limb over my knee so as to break up the connection between the misplaced fragments. It has been asserted that the long supinator or square pronator opposes reduction of the deformity. This is undoubtedly a fallacy in so far as any real obstacle is offered by these muscles.

This other woman shows the exact deformity possessed by the old woman before I reset her mal-united fracture. I will now exhibit to you the manner of correcting the deformity in unreduced fractures of the lower end of the radius. This patient was treated four or five months ago for fracture of the radius, and it was believed that the lower fragment was properly reduced. If it were properly reduced, a Bond's splint or some equally bad form of splint, which did not conform to the curvature of the palmar surface of the bone, was probably used. As I have frequently told you in this clinic, a straight splint put on the palmar aspect of the forearm in the treatment of these fractures is very apt to push the lower fragment upward into the position of former displacement. It is quite probable that this is what occurred in the present case.

At any rate, the woman has now an unreduced fracture with the fragments united in an improper position. Under ether I bend the hand strongly backward, taking care to bring the strain upon the seat of fracture and not upon the wrist-joint, which I protect by the manner of grasping the limb. Failing to break the union, I now bend the bone across my knee, using, as you see, great force. You can hear the tearing of the bone as the fracture gives way through the bond of callus. I can now push the lower fragment into position by making extension and counter-extension, and pressure with my thumb on the back of the lower fragment. You see the difference produced in the shape of the forearm. A straight splint will be applied to the dorsal surface of the wrist for a few days, and I shall then use a wristlet of adhesive plaster without other restraining apparatus. The pain in her

wrist and fingers, as well as the stiffness of the fingers, will probably be at once greatly relieved.

It is curious that these two cases should come to the clinic for operation within a few months of each other. It shows how common is improper treatment of these fractures. I frequently have to reset imperfectly set, or refracture improperly united, fractures in this locality.

[*Note.*—The patient returned at subsequent clinics and recovered the good use of her fingers and wrist with but moderate deformity. She stated that the discomfort after refracture was much less than before the operation. The result naturally was not quite as satisfactory as it would have been if the fracture had been properly reduced in the early treatment of the case.]

The ignorance of the true pathology of this fracture was formerly so great that many ridiculous splints were devised for its treatment. Many were constructed on the theory that the extensor muscles of the thumb were a cause of the deformity, and not a few were employed that failed to recognize the curvature of the palmar surface of the lower portion of the radius.

After reduction, the ordinary fracture of the inferior extremity of the radius rarely requires such rigid support as a splint, because the transverse fracture gives a broad rough surface of contact, and the extensor tendons running over the dorsal surface of the bone act as tense straps to hold down the lower fragment.

If there is much comminution, or if the patient is a careless man or a romping boy, it is at times wise to use, as an extra precaution, a short and narrow dorsal splint upon the back of the wrist. It may be made of a piece of cigar-box, a strip of metal, or two or three whale-bones such as are used in ladies' dress-waists. It should extend only from the middle of the metacarpal bones to the junction of the middle and lower thirds of the forearm, being therefore about six inches long. Its width need not be over one inch. It should be held in place by adhesive plaster or a bandage encircling the limb.

This dressing should not be employed longer than ten days or two weeks at the outside, during all of which time the patient ought to be encouraged to use his fingers as freely as pain and swelling will permit. In the great majority of cases this dressing is unnecessary, and a simple roller bandage or a wristlet made of two or three superimposed strips of rubber adhesive plaster is all that is needed.

This simple method of treating the fracture gives the patient the necessary freedom in moving his fingers from the instant the fracture

is set, does not prevent his wearing a sleeve, allows inspection of the parts, is inconspicuous, light, clean, and efficient.

The dressing employed may usually be discarded in ten days or two weeks in ordinary cases, and in three or four weeks in comminuted fractures. Long retention of the appliances is unnecessary and even deleterious when splints are employed, because of the greater tendency to stiffness thereby induced.

In properly-treated cases of ordinary severity, perfect use of wrist and fingers is obtained within a few weeks after the injury. Patients can often write a little, and use the hand for dressing themselves, within two weeks. This facility varies with the amount of comminution and inflammation. Persons of gouty and rheumatic tendencies are probably more liable to stiffness of fingers and wrist than others. Fractures in other regions present the same complication in such individuals. Much of the rigidity of wrist and fingers attributed to rheumatic and gouty causes, or to the senility of the patient, I believe to be due to imperfect reduction of the fragments and to unscientific and unwise treatment. I have not recognized the stiffness and rigidity after this fracture in the aged which some authors mention with emphasis. I expect the same early and perfect freedom of motion in these as in the young, except in so far as the aged are more liable to rheumatism and gout.

MACEWEN'S OPERATION FOR RACHITIC DEFORMITY OF THE FEMUR; INFLAMED HEMORRHOIDS.

CLINICAL LECTURE DELIVERED AT THE BUFFALO GENERAL HOSPITAL.

BY ROSWELL PARK, A.M., M.D.,

Professor of Surgery in the University of Buffalo.

GENTLEMEN,—This case is that of a young child with rachitic deformity of the lower limbs. On inspection you will notice that there is very much more deviation of the axis of the leg from that of the femur than there should be. The tibia appears to be perfectly formed; the trouble is that the inner condyle of the femur is on a lower level than is natural. We cannot raise the condyle without splitting it off and performing an operation that is unwarranted on account of its severity, but we can bend the femur, or, at any rate, break it, and thus atone for the position of the condyle. An operation below the knee would be a mistake in such a case as this. When the knees are directed forward and brought together, we find that there is marked knock-knee and anterior curvature of the femur.

If one had sufficient room to grasp it, the bone could hardly resist the force which I apply; but, on account of the small size of the bones of the child, I will use the osteoclast. I now apply considerable force with the osteoclast. After the removal of the osteoclast, I find that nothing has been accomplished. I think, therefore, that I shall do less harm to break the bone by means of the chisel. There is a prevalent opinion that a child's bones break very easily, but in more than one instance I have exerted all my strength on such a case and have failed to break the bone.

The point for the insertion of the chisel in this operation is just above the tubercle of the adductor magnus, which is slightly above the internal condyle of the femur. After carefully washing and disinfecting the leg, a small incision is made just above the tubercle for the insertion of the great adductor, high enough to avoid the femoral artery and its accompanying structures. The wound is relatively larger in a small child than in an adult. After introducing the chisel,

the wound is closed temporarily with antiseptic gauze wound about the handle of the chisel, the bone is cut into sufficiently to allow it to be broken with the hand, and then a light gauze dressing is wrapped about the thigh. I will repeat the operation on the other leg.

I now dress the wounds with iodoform gauze, and bichloride gauze over that, held on by a gauze roller bandage. A cotton-wadding roller is applied to the leg and thigh, beginning at the foot, and over this a starch bandage.

Professor Macewen, of Aberdeen, Scotland, has done this operation nearly a thousand times without a death. Those figures will give you an idea of the amount of rachitic disease in Scotland. Do not imagine that the operation is finished with putting on this bandage, for a great deal remains in seeing that the position of the leg is correct while the plaster-of-Paris bandage, which we will now apply, hardens. If we do not correct the deformity now it will not be corrected at all. It is better to over-correct the deformity slightly than not to correct it sufficiently. In the left foot the child has a slight tendency to talipes equino-varus, and in applying the plaster-of-Paris bandage I will overcome that deformity also.

You have seen that I have made two wounds here, and have sealed them hermetically without thought of drainage. You remember a little colored infant from whom I removed the astragalus for an aggravated case of club-foot. That was quite a severe operation of the removal of bone and opening into a joint-cavity, but we observed perfect asepsis throughout the operation, and the wound was closed without drainage, and it healed perfectly in two weeks. This present operation is certainly much less severe: nevertheless, if I had not absolute confidence in our aseptic precautions, I should not think of so closing any wound without drainage.

My next case is one of considerable pathological importance, and one which would probably give you considerable trouble. I have not yet seen the case, but, taking the statement of others as to his condition, I am having him anæsthetized, and I shall present him to you in a few minutes. It is a case of inflamed piles. Let us consider the nature of acutely-inflamed hemorrhoids. A number of hemorrhoidal protuberances which come down frequently, or which remain down, constitute a bad enough state of affairs, but when to this is added the element of acute inflammation there is positive danger. Our patient was sent here late in the afternoon yesterday, and the main thing then was to give him relief. He was given a quarter of a grain of morphine and a suppository of opium, belladonna, and ergot.

Hemorrhoidal tumors, composed as they are of a series of enlarged veins, being really nothing but originally varicose veins covered by mucous membrane, are just as liable to inflame as venous structures enlarged into varices anywhere else. I have told you that inflammation of veins is always a very serious thing, though it is not necessarily fatal. The exposed veins and the hemorrhoidal tumors are covered ordinarily only by mucous membrane, which, however, by constant contact with the clothing and the air, if the piles are always exposed, becomes thickened and tough, and sometimes loses its characteristic appearance, while the exposed veins bleed frequently, as is well known to the laity. They are easily ruptured and are subject to inflammatory irritation. When once inflamed, the trouble may remain in the group of varicose veins, or it may spread to two or three veins with which they are connected. While the external hemorrhoidal veins are virtually subcutaneous veins, and connect with the veins of the skin, the middle and superior hemorrhoidal plexuses connect with the veins of the portal system. An inflamed pile may degenerate and suppurate, forming a septic focus; septic thrombi may then form in the veins, become dislodged by defecation or by some motion on the part of the patient, and may be carried, as thrombi always are, along the course of the venous circulation, and taken, not to the right side of the heart, but to the liver, where they will set up just the same trouble as thrombi from the systemic veins would set up in the lungs,—that is, a series of minute abscesses. Thus, not infrequently, men have died of abscess of the liver consequent upon trouble which began in hemorrhoidal tumors. That is one objection to the method of treating hemorrhoids by injection with carbolic acid, a procedure which is largely practised by a number of quacks who travel about the country, advertising to cure piles without pain. That is a euphemism, because they do inflict some pain, although it is a minimum. They usually keep their method secret; they get the patient to expose the part, and then they draw a hypodermic syringe and make an injection without letting the patient see what they are doing. Usually there is not a great deal of pain, and a cure is effected, though sometimes death follows from abscess of the liver and septicæmia or pyæmia resulting.

An inflamed vein, under any circumstances, is to be dealt with with great caution. To treat an acutely-inflamed pile as one would treat an uninfamed pile would be the height of rashness. I do not mean to say that the result would be always fatal, but that there would always be danger of such a result. One must adopt the mildest form of treatment and subdue the inflammation unless there is some element of the

case which calls for radical treatment at the beginning. You may be sure of this, that inflamed piles will cause the same kind of spasm of the sphincter and that an inflamed cornea causes about the eye. With a child who has inflammation of the cornea or any other part about the eye, there will be vigorous spasm, so that you cannot separate the eyelids unless you anæsthetize the child or use considerable force. The spasm of the sphincter and is always painful, but in the case of inflamed piles there is another feature which is important. The hemorrhoidal veins pass not merely between the mucous membrane and skin of the anus and the muscular coat of the rectum, but also between the fibres of the sphincter muscle; spasm of the sphincter, therefore, causes pressure on the veins and distention of the piles, and this again causes increased spasm of the sphincter, the two phenomena reacting on each other. In this engorged and inflamed condition, what is to be done? If the engorgement be apparently the most prominent feature, you can tap the hemorrhoidal tumors and let the blood escape. You must not do this too freely, or you will invite secondary hemorrhage. If, on the other hand, the spasm seems to be the prominent feature, the sphincter must be vigorously stretched, so as to paralyze it.

Here appears to be an inflamed and gangrenous condition of affairs. This was represented to me as a case of acute inflammation, but I do not find the indications of very acute inflammation, and so I shall treat it in a different way from that which I have just been describing to you. On examining the rectum with a Sims speculum, I find a tumor which was evidently originally a hemorrhoid, but it feels hard, and on puncture the blood does not gush out, as it would from a distended vein: there has evidently been an organization of the hemorrhoid into connective tissue.

I think we will be pursuing the wisest course by simply stretching the sphincter to-day, and then endeavoring to build up the patient's strength and watching him carefully, using fomentations to get a line of demarcation between the living tissue and the gangrenous portion of the pile, and then, in a week or so, we will perform the radical operation of removing the tumor. I should not be at all surprised if after four or five days very much of the present inflammation would have subsided, leaving simply the chronic condition. His sphincter will be paralyzed for two or three days, during which time he will get a large amount of relief from the necessary local rest. We will use suppositories containing morphine enough to control pain, a little ergot for its effect on the vessels, and some antiseptic in addition, such as iodoform or aristol.

OPERATION FOR OCCLUSION OF THE CYSTIC DUCT, WITH CALCULI IN THE GALL-BLADDER.

CLINICAL LECTURE DELIVERED AT THE SOUTHERN MEDICAL COLLEGE, ATLANTA, GEORGIA.

BY J. McFADDEN GASTON, M.D.,

Professor of the Principles and Practice of Surgery, Southern Medical College, Atlanta.

GENTLEMEN,—The patient who comes before you to-day is the widow of a physician. Mrs. K., as you will see, is a white woman, about fifty years old, but little emaciated, of whose previous sufferings the family attendant, Dr. Garrett, furnishes a brief account. He has attended her at her home, near Austell, in this State, at various times within the past four years, for hepatic colic and jaundice. Eventually there appeared an enlargement, with tenderness upon pressure, below the points of the ribs on the right side, and she complained of acute pains at times in this region.

Upon examination of her case yesterday, when she arrived in this city, I learned that the attacks from which she had suffered formerly had been less frequent of late, and not followed by any discoloration of the skin within the past twelve months. It was also learned that her fecal evacuations, which had for two years prior to the last year been clay-colored, had resumed their natural appearance. But there was persistent torpor of the bowels, requiring frequent resort to purgatives of an active nature.

When my attention was directed to the right hypochondriac region, I found a very perceptible enlargement of the liver, extending below the points of the false ribs, and by palpation I detected an indurated mass at the lower margin of the liver, which was quite movable. The outline was rather globular below, but extended upward beneath the liver, and inclined to the right when the patient turned upon her right side, and towards the median line when she turned upon her left side. When she lay upon her back the indurated mass corresponded to the usual site of the gall-bladder, and could be lifted upward and forward

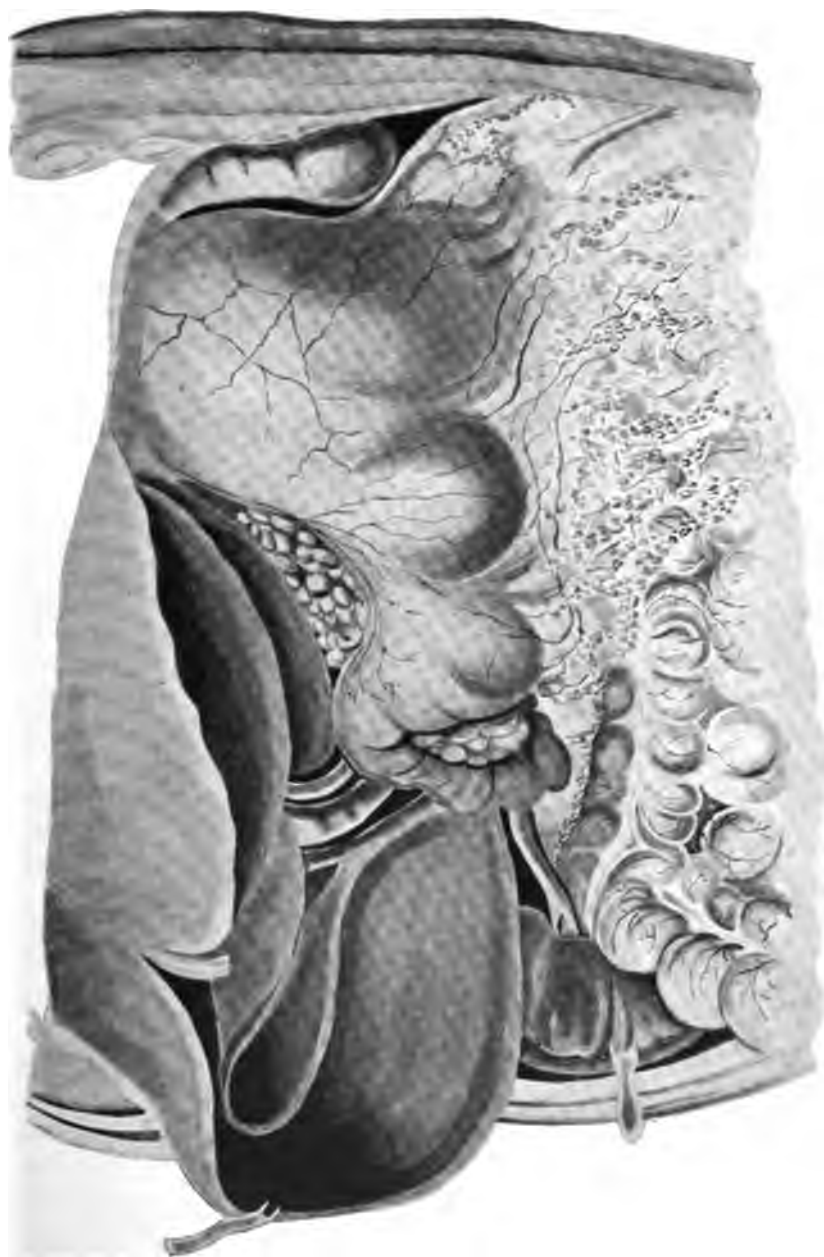


FIG. 1.—Topographical relations of the cystic and common bile ducts. Re-drawn by Dr. A. Fiedler.

by the fingers thrust under it. The effect of gravity in this position caused it to drop backward, and to the eye there was no prominence from it when the thighs were flexed upon the body in the dorsal decubitus.

Considering the great mobility of the mass, with the absence of jaundice recently, there were some grounds for suspecting that it might be a floating kidney, and a colleague who made a careful examination of the case spoke of this without any suggestion on my part. But after comparing the indications for a diagnosis of floating kidney with the points observed in this patient, we both concluded that the preponderance of evidence was in favor of an obstructed gall-bladder with retained biliary calculi, and this is the diagnosis upon which I shall operate in this case.

It may be stated in advance that I do not expect to find the common bile-duct obstructed by gall-stones, as the bile is finding its way into the alimentary canal, as indicated by its presence in the evacuations. It is clear that an impediment of some kind exists in the cystic duct, as the contents of the gall-bladder are evidently confined in that viscus, and it is most likely that biliary calculi will be found in it. You perceive from the drawing on the wall before you that, with the relations of the cystic and common bile-ducts, the duct connecting with the gall-bladder may be entirely occluded, while that leading directly from the liver to the duodenum may be free from obstruction. (See Fig. 1.)

The procedure in this case is entirely different from that which would be requisite for the relief of occlusion of the common duct. The latter being unable to convey the bile into the intestinal canal, while it flows freely into the gall-bladder from the hepatic ducts, calls for a communication to be effected by attaching the gall-bladder to the duodenum or some portion of the small intestine. Various operations have been resorted to for this purpose, based upon a series of experiments made upon dogs, by me, nine years ago, with a view to demonstrate the feasibility of effecting an anastomosis of the gall-bladder with the duodenum or the upper portion of the small intestine. It matters not whether an opening is made by my process or by some other, so that the bile is given an outlet from the gall-bladder directly into the intestinal canal, and thus plays its rôle in intestinal digestion. Relief is thus afforded to the colæmia which is poisoning from the presence of bile throughout the system, and which is shown by jaundice in cases of biliary obstruction.

Our patient will not require to have an operation of this nature, but simply to have the contents of the sac removed, and to have the

gall-bladder secured by sutures to the parietal opening, so as to accomplish thorough drainage from its cavity.

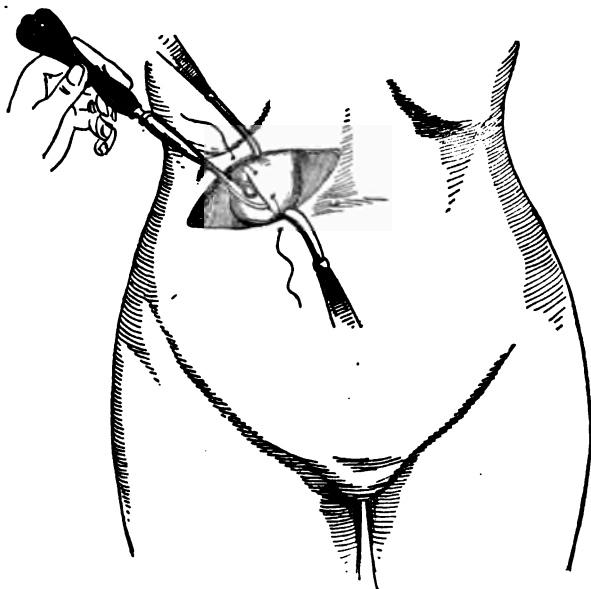
The patient took an active purgative of Epsom salt with senna tea yesterday afternoon, and was instructed to take nothing but tea and toast this morning. Our clinical staff have been directed to cleanse effectually the surface of the hypochondriac region, administer hypodermically morphine $\frac{1}{4}$ gr., and atropine $\frac{1}{160}$ gr., and give her an ounce of rye whiskey with a little sweetened water. This being done, she will be put under the influence of the A. C. E. mixture, which has proved most satisfactory as an anæsthetic, and which you have seen so often used in my clinics without untoward results of any kind. With the preliminary use of morphine and atropine, followed by whiskey toddy, I am convinced that there is less danger from shock in employing this combination of one part alcohol, two parts chloroform, and three parts ether, than from any other mode of securing anæsthesia for protracted operative procedures.

As the patient has already been submitted to the influence of this anæsthetic with the use of an ordinary cone formed with a towel, she may be brought in from the adjoining room for the operation.

You perceive no marked prominence below the points of the ribs on the right side, but palpating over this region I distinctly feel the outline of what has been diagnosed as a distended gall-bladder, about the size of a turkey's egg. I proceed to make an incision, three inches long, diagonally across this mass, just below the margin of the liver, and about two inches below the costal cartilages, parallel with the lower border of the false ribs. (See Fig. 2.) Having sponged off the blood from this incision with hot water, and the oozing being arrested, the peritoneum is opened, and now we have fully exposed the fundus of the gall-bladder. Finding it impracticable to bring the distended sac out of the parietal opening, either with my finger or with a lever scoop passed beneath it, I proceed to secure the wall by a curved needle with a strong silk ligature carried through the anterior portion of the fundus of the gall-bladder; letting it remain double, the needle is cut loose and the ends knotted together, making a loop, including an inch of the tissue of the sac, which is delivered to an assistant to keep the fundus supported, and projecting at the external incision. A trocar is now thrust into the fundus, and you see a mucoid fluid, without any appearance of bile, flows out. Introducing my finger outside of the sac, I feel a number of gall-stones within its cavity, and with a view to their removal an incision is made with a scalpel from the point where the canula enters, extending an inch across the fundus of the gall-bladder.

With the calculus-scoop introduced at this opening, one calculus after another is removed, until we have six, and upon passing them around it will be seen that each has facets from contact with the others and friction in the gall-bladder. Upon introducing my index finger into the sac, no other loose calculi are found, but I can feel distinctly a gall-stone embedded in the mucous membrane, near the neck of the gall-bladder, and thus completely encysted. As there is no probability that

FIG. 2.



Line of incision to expose the gall-bladder, with the retractors and calculus-scoop in position.

this can become a source of trouble if left alone, and as there might be hemorrhage from making an incision for its removal, I shall adopt the plan of masterly inactivity and not interfere with it.

Upon passing the finger outside of the sac along the cystic duct, it is found like a hardened cord, with its walls completely agglutinated, and hence there is no prospect of its becoming pervious, so as to carry bile into the gall-bladder. There is no evidence of any obstruction in the common duct from palpation with the point of my finger along its tract, and therefore a free outlet of the bile from the hepatic ducts, through the common duct, into the duodenum, may be relied on for the future, as it has occurred during the past year. We shall expect atrophy and obliteration of the gall-bladder under the further observation of this case, with the use of drainage.

The gall-bladder will now be anchored to the abdominal wall, by threading needles with the ends of the ligatures passed through the wall of the sac and carrying them through the edges of the external incision. It is observed that when the ligatures are brought out and the ends are crossed, the external wound is closed up at that point completely. But previous to knotting them I proceed to suture the parietal peritoneum to the cystic peritoneum, around the incision in the sac, and thus effectually obviate the escape of any of the mucoid contents of the gall-bladder into the peritoneal cavity of the abdomen, and afford it a free outlet, externally, through a large fenestrated drainage-tube, which is left in the opening from the gall-bladder.

Being now prepared to close the upper and anterior portion of the parietal incision, three stitches of interrupted suture are inserted through all the structures of the abdominal wall, and, these with the anchoring suture being knotted, there is left only an opening at the lower and posterior end of the external incision, at which the edges of the cystic incision afford an outlet from the cavity of the gall-bladder. The drainage-tube which has been inserted will be attached by a safety-pin, for the present, to the margin of the skin, but subsequently this will be removed and secured to the dressing.

The incision is dusted over with iodoform, and iodoform gauze, with a hole for the drainage-tube, is laid over this, while a thick compress of absorbent cotton is held in position by a broad roller bandage carried several times around the body of the patient.

You observe that the patient inhaled the A. C. E. mixture without any indication of disturbance during this somewhat tedious operation, and that she is now recovering from its influence without any signs of shock.

The patient will be removed on the operating-table to the waiting-room, and after she is entirely restored to consciousness will be placed on a litter and carried to her quarters, with instructions for the nurse to withhold food and drink during the day.

It will be profitable to draw your attention to some points which could not be well referred to in the course of the operation which has just been completed. I would note, first, the great tension of the wall of the gall-bladder from the accumulated mucus in the cavity, and the consequent firmness and resistance of the tumor when palpated through the abdominal parietes. Even after the sac was laid bare by the external incision, the sensation upon manipulating the ovoidal body was that of a solid mass rather than the elasticity of a sac containing fluid. The color of the sac was seen to be rosaceous with a pearly opaque hue,

differing very much from the greenish complexion of the sac when bile is contained in the cavity of the gall-bladder. As you perceived, the edges of the cut in the sac were much thicker than natural, and the tissue was considerably indurated, so that it might be inferred to be impaired in vitality and prone to ulceration or disintegration, from contact with the gall-stones within.

In these conditions we recognize the fact that an operation was requisite to secure against serious results, such as those reported recently as verified by a post-mortem examination in a case under the care of Dr. J. H. Musser, of Philadelphia. The patient had suffered repeatedly from the presence of gall-stones, but declined to have any operation, when ulceration of the sac allowed them to escape into the abdominal cavity, and peritonitis ensued, from which she died. A fatal result of perforation is reported by Dr. Anders also.

The woman who has just been relieved of these biliary calculi by a procedure involving but little risk to her life has assuredly been spared from a hazardous condition, threatening grave consequences.

There might have been some grounds for resorting to complete extirpation of the gall-bladder in this case, as there is no prospect of the restoration of the functions of the organ. Had I concluded to do this, it would have been necessary to make a larger incision into the abdomen, and the detachment of the gall-bladder, whether by dissection from the liver or by cutting off its walls from the adherent surface, would have been attended with hemorrhage, which might have jeopardized the life of the patient. There would not have been any trouble in this case connected with the ligation of the cystic duct, as it was completely obliterated; yet the great increase of traumatism from cholecystectomy, beyond what is requisite for cholecystotomy, induced me to give preference to the latter. Had the wall of the gall-bladder presented indications of disintegration, I should have removed the sac; but, having the tissues in a favorable state for external drainage, it was best to retain the sac, and suture the incision in its wall to the incision in the abdominal wall, as you have just witnessed in my operation.

It is expected that atrophic degeneration of the gall-bladder will ensue, after a longer or shorter period of drainage, and that the mucous coats will disappear and the inner surfaces become agglutinated, forming simply a fibrous band from the solidified cystic duct to the point of attachment to the parietes of the abdomen.

You observed that silk was employed in suturing the edges of the parietal peritoneum to the serous covering round the incision in the fundus of the gall-bladder: this will be allowed to remain, in the ex-

pectation that it will be encysted and remain buried in the tissues after the healing process has been completed.

In view of the favorable results of similar cases, under various operators, in different parts of the world, I feel confident that our patient will be entirely relieved by this operation.

[*Note.*—The temperature did not exceed 100° F. at any time after the operation.

The anchoring suture was removed on the third day, and the interrupted suture in the parietal incision was left until the eighth day.

The drainage-tube was cut off gradually, and was finally removed on the twelfth day.

There was a considerable discharge of watery mucus during the first week, but this diminished from day to day, and on the thirteenth day there was no longer any discharge. The wound was all closed on the fifteenth day, except at the lower end, where a piece of gauze had been kept to prevent union of the skin. There has been no trace of bile in the discharge from the gall-bladder at any time. It is evident that the sac will undergo slow atrophy and be ultimately obliterated. The bile is passing through the common duct into the duodenum, and is fulfilling its office as heretofore.

The patient left for home on the twenty-third day, with the wound closed, and with a fair prospect of complete restoration to health.]

CHOLECYSTENTEROSTOMY WITH MURPHY'S BUTTON; REMOVAL OF A FOREIGN BODY FROM THE LEFT BRONCHUS; THE EXAMINATION AND REVIEW OF A "SUCCESSFUL" CÆLIOTOMY.

CLINICAL LECTURE DELIVERED AT ASBURY METHODIST HOSPITAL.

BY JAMES H. DUNN, M.D.,

Professor of Genito-Urinary Surgery in the Medical Department of the University
of Minnesota; Surgeon to St. Mary's and Asbury Hospitals,
Minneapolis, Minnesota.

GENTLEMEN,—This woman, thirty-seven years of age, and the mother of six children, presents nothing in her family or individual history previous to her present trouble which need detain us. It will be observed that she is poorly nourished, is so emaciated that she appears older than her years, and is slightly jaundiced. She has not been herself physically since the beginning of her present disease, about four years ago. An acute seizure of severe pain in the right hypochondrium radiating into the shoulder and across the abdomen, vomiting, and intense headache, then ushered in her malady. Relieved by morphine, she gradually recuperated, and left her bed in a few weeks, but with impaired digestion, constipation, soreness in the right hypochondrium, and some jaundice. At intervals of three or four months ever since, similar attacks, more or less well marked, have occurred, relegating her to bed for from three to eight weeks, and frequently requiring morphine for their final relief. Several times she has been markedly jaundiced, and she has eventually become practically invalided all the time. She has been in the hospital ten days, during which time she has had one acute attack requiring the hypodermic use of morphine. Her urine is highly colored with bile-pigment; her bowels are torpid, and the movements clay-colored.

On examining the abdomen, the whole right hypochondrium is found tender, but the most sensitive point is apparently just under the costal cartilages at a point about three inches from the mesial line.

Careful palpation reveals the presence of a slight enlargement in the anatomical location of the gall-bladder under the margin of the liver. The obscure tumor appears to slip away, and the patient has called my attention to having felt it herself, and describes it as slightly movable and specially sensitive when manipulated. Just exterior to this is a much more distinct, larger, and harder mass continuous with the liver, also sensitive to pressure and manipulation. It is either simply the edge of the liver projecting very low beneath the costal border, or, as I have suspected, the hepatic border plus inflammatory exudate and adhesions from repeated inflammatory reactions in this vicinity. In short, the patient presents a very fair history of cholelithiasis. What consecutive changes obstruction and irritation may have led to I cannot say. In fact, it might be more prudent not to be even thus explicit in diagnosis, and, going only as far as we know, say, as I have said, to the patient, that we evidently have obstruction in the gall-passages sufficiently serious to demand an exploratory incision, after which we will cope with the conditions found to the best of our ability. If so far mistaken that nothing can be done, we will close the wound after achieving only the small but not altogether unpractical comfort of arriving at a positive, if disappointing, diagnosis. To be sure, there are advantages and comforts in knowing just what is going to be done before beginning an operation, but in abdominal surgery this is not always entirely possible; hence it is well to consider carefully the different conditions which might be encountered, so that being forewarned we may be forearmed.

1. This obstruction could be due to a variety of conditions,—viz., (a) to cholelithiasis or gall-stones; (b) to cancer or neoplasms involving the gall-ducts; (c) to cholecystitis.

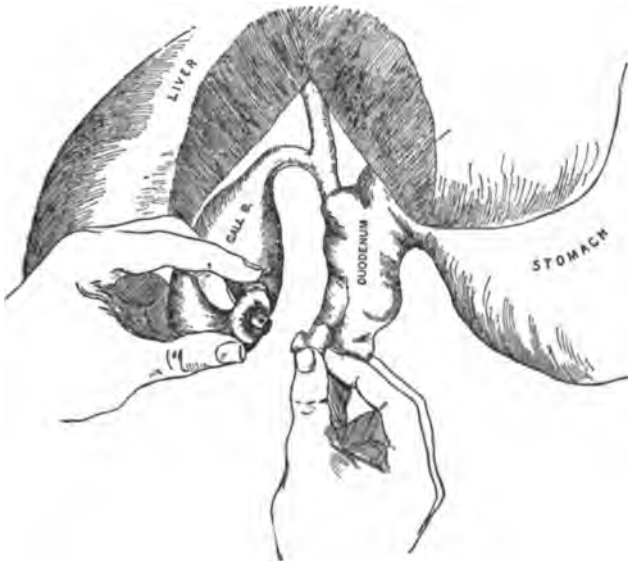
2. Assuming the cause to be gall-stones, these might be located,—(a) in the gall-bladder; (b) in the cystic duct; (c) in the hepatic duct; (d) in the common duct, or in diverticula.

3. The state of the gall-bladder and neighboring parts may present a variety of conditions. There may be adhesions and various secondary changes. The bladder may be greatly distended, or, as in a case successfully operated upon in this hospital last year, it may be contracted to the size of a bean and occupied by a sandy débris.

In dealing with these varying conditions incident to the same primary disease the procedure must obviously vary. In the case just mentioned the remnant of the organ was removed,—cholecystectomy. Finding calculi in the gall-bladder, it might be incised and the stones

evacuated,—cholecystotomy,—after which the incision might be sutured and the abdomen closed, or the bladder could be stitched to the abdominal walls and the fistula established. The former treatment has been associated with too discouraging a mortality to allow of its meeting with general approval; the latter leaves a fistula more or less troublesome to close, while if all the gall be thus discharged by it the patient perishes of inanition, since the bile appears to be indispensable to digestion. Nature has sometimes by adhesions and ulceration into the duodenum indicated what appears to be the best treatment of the most common obstructions of the bile-passages,—viz., establishment of a

FIG. 1.



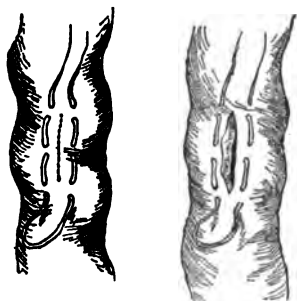
The Murphy button in position in cholecystenterostomy.

fistula between the gall-bladder and the duodenum,—cholecystenterostomy. Until recently, however, this operation has been so difficult of successful performance as to be practically out of the question. Thanks to the genius of a brilliant American surgeon, Dr. J. B. Murphy, of Chicago, we are now in possession of a mechanism—the Murphy anastomosis button—which reduces cholecystenterostomy to one of the most simple, rapid, and precise of surgical procedures, and one apparently safer by far than any method heretofore devised.

We are indebted to Professor F. A. Dunsmoor for this case, but, owing to his own serious illness, he is unable to operate, after having made the diagnosis and set the day for the operation. I now make

an incision three inches long in the right linea semilunaris from the costal border downward, and dissect down to the peritoneum. Now, pausing a moment to stanch all hemorrhage as thoroughly as possible, this membrane is opened, and the border of the liver, with its notch, from beneath which the gall-bladder slightly projects, comes to view. The bladder is not materially abnormal in size, but is felt to be nearly filled with concretions. A little search brings to view the adjacent part

FIG. 2.



Application of sutures for the use of the Murphy button.

of the duodenum. Having no mesentery, it is not easily drawn up into the wound, but being the largest portion of the small intestine, and lying so close to the gall-bladder, there is no great difficulty in bringing it within easy reach. It is necessary to avoid mistaking the colon or other portions of the intestinal tract for the duodenum. I now relieve the tension of the gall-bladder by aspirating three drachms of abnormal bile. Now, with a straight needle armed with silk, two running stitches are taken in that viscus, then the needle is turned and two more stitches are placed parallel to and one-fourth inch distant from the first. This is exactly repeated on the duodenum. (Fig. 2.)

A small incision in each organ admits the respective ends of the button, the loops of thread are drawn down and tied around their necks, the adjacent peritoneal surfaces slightly scratched, the halves of the button pressed together, and the wound is ready to be closed with carefully applied silkworm-gut sutures. These should be so placed as to secure the most exact apposition of the several parts, peritoneum to peritoneum, fascia to fascia, muscle to muscle, and skin-border to skin-border. To best accomplish this result the needle is entered near the border of the skin, so passed as to surround more and more of the wall until the centre of its depth is reached, then less and less until its exit just behind the peritoneal border; then on the opposite side exactly the same procedure in reverse. So placed, the stitches enclose a round mass of tissue so pressed together as to insure the most perfect apposition of tissue to tissue.

I have taken out some twenty-five or thirty of these stones (Fig. 3) to show you before putting in the button, but this is not only not necessary, but not in accord with the theory of the operation, since they will readily pass into the intestine when the fistula is established

by surgical interference, and the time spent in removing them is simply so much time lost. There are still a number left in this case to be passed through the intestine. The great service of the button in such a case lies in the ease, rapidity, and safety with which a cholecystenterostomy may be effected. The operation has been performed in ten or twelve minutes, while to make it by safe suturing would require an hour or more at the hands of a most expert operator, and sometimes might present almost insurmountable difficulties, to say nothing of the long handling, the possible soiling, and the uncertainties and dangers of many stitches, which must not leak, must not penetrate all the coats of the intestine, and the fate of which must be

FIG. 3.



Calculi from the gall-bladder. At the right end of the cut is shown the button as it appeared after passing through the patient's intestinal tract.

uncertain and fraught with more or less danger. The button is easily manipulated, has almost the precision of mathematics, and appears to be the *ne plus ultra* of cholecystenterostomy. So far as I am informed, there have been about twenty successful operations reported since the introduction of this truly ingenious mechanism by Dr. J. B. Murphy in June, 1892. Thus far I know of no failures chargeable to this mode of operation. In some cases of biliary obstruction due to advanced malignant disease the patients have died of their incurable disease. It is not often that we can decide positively concerning the worth of a new surgical procedure in so short a time,—only mature judgment after wide and large experience can ordinarily fix its status,—but in this instance the principle is admitted, and the means of its accomplishment has given such uniform experimental and clinical results that it would appear established as the most perfect yet devised for the relief of a large part of the not infrequent and serious cases of biliary obstruction.

[NOTE.—The patient made a good recovery, the highest temperature recorded after the operation being 100°. The jaundice rapidly cleared up, the appetite became keen, and the button (Fig. 3) was passed on the eighteenth day. It contained the two loops of thread and a small ring of necrotic tissue.]

FOREIGN BODY IN THE LEFT BRONCHUS.

This twelve-year-old lad has just been brought into the hospital from a country town with the report that he has a foreign body in his air-passages. It is reported that while playing with an empty cartridge-shell some time yesterday it was drawn into and passed through the larynx. You observe there is marked dyspnœa, he complains of pain and oppression in the chest, while his face, neck, trunk, and arms are phenomenally distorted and tumid, the eyes being closed by distention of the skin. On palpating any part of the upper half of the body, a fine crackling is felt, which readily explains the cause of the striking bloated appearance of the patient,—viz., the areolar connective tissue is inflated by air which has escaped from the pulmonary air-cells. This is termed cellular emphysema, and this boy presents one of the most pronounced examples of the condition that I have ever seen. This condition of subcutaneous transfusion of air may arise under four circumstances: (a) penetration of the lung through the chest-wall, as by a fractured rib piercing the visceral pleura; (b) rarely in certain wounds of the thorax opening the pleural cavity without injuring the lung, the external air being sucked into the pleural sac during inspiration, and, if the wound be valvular or tortuous, during expiration it is partially injected into the subdermal connective tissue; (c) in like manner a wound or ulceration of the lung from the mucous side, through a bronchus, allows the air in the lungs to be forced, under the pressure of expiration, into the pulmonary connective tissue, from which it finds ready exit through the mediastinal areolar tissue to the subcutaneous; (d) without any external injury to the skin or pleura, or any internal lesion of the bronchial mucosa, pulmonary air-cells are ruptured, *e.g.* by severe coughing, especially when a bronchial tract is tightly plugged, air escapes into the pulmonary areolar tissue, and takes the same route as before. This last is evidently the explanation in this case. During the violent expulsive efforts of coughing, the column of air having no outlet, air-cells have been ruptured like closed gas-bags subjected to pressure greater than their strength.

Emphysema is said to occur in but a small percentage of cases of this character, and according to some, *e.g.* Poulet, "Treatise on Foreign Bodies in Surgical Practice," its appearance renders the prognosis very grave. This author says that death has occurred in all or almost all such cases. I see no reason why this complication should be so grave, unless it be that the distention of the pulmonary



FIG. 4.—Boy of twelve from whose bronchus a cartridge-shell one and a quarter inches long by three-eighths of an inch in diameter was removed after tracheotomy.

connective tissue reduces the distensibility of the lungs and leads to gradual asphyxia. In the considerable number of cases in which I have observed the condition, nothing has ever occurred to give the symptom much significance; but, never before having observed the symptom in connection with foreign bodies in the air-passages, I can express no opinion. On physical examination I find loss of fremitus, absence of vesicular murmur, and normal or increased resonance over the lower part of the left lung. The probable seat of the foreign body is the left bronchus or its lower secondary division. This is rather unusual, since, owing to the position of the bronchial spur, somewhat to the left of the mesial line, the chances are about two to one that a foreign body will pass into the right bronchus. Our duty is plain: an attempt must be made to remove the shell. Not only is the lad suffering greatly, but secondary pulmonary destruction will surely follow sooner or later. Though foreign bodies have often been luckily expelled even after long delay, and though instances of the establishment of a wonderful toleration of the passages are on record, such remote and uncertain results at the expense of great risks and prolonged agony are not worthy of consideration. We shall open the trachea, search for the offending body, and, finding it, attempt to extract it by the forceps. If we are unable to find it, the tracheotomy may not prove in vain, since if by coughing or by position it is possible to move the foreign body, experience has shown that it is more readily expelled through the tracheal wound than through the rima glottidis.

The patient is not an encouraging subject to operate upon. The extensive emphysema is apparent enough to you on the exterior, but the mediastinum and pulmonary areolar spaces are likewise injected. The dyspnoea is marked. Naturally short-necked, he now appears not to have neck enough for our short incision. He is now sufficiently anæsthetized (by chloroform), and I make an incision from over the median notch of the thyroid down to just above the episternal notch, a distance in this patient of only about an inch and a half. The soft parts are quickly separated in the median line, and the larynx and first ring of the trachea exposed. Copious air-bubbles appear as soon as the skin is incised. I now pass a thread through each side of the thyroid cartilage, to serve as retractors, and incise the larynx in the mesial line. I have then made a laryngotomy instead of a tracheotomy. It is much easier and quicker, and will, I think, serve our purpose quite as well. There would be no great difficulty in going a little lower, incising the crico-thyroid cartilage and the first ring of the trachea (laryngo-

tracheotomy); but a true tracheotomy below the isthmus of the thyroid gland would be exceedingly difficult, if indeed possible, in this subject. I now pass this bullet-probe down into the left bronchus. It passes a distance much greater than I would suppose, about six inches, and the body is felt. This long alligator urethral forceps is now substituted for the probe. It does not so readily find the body. I think I feel it, however, as the forceps are withdrawn. It is evidently lodged beyond the primary bronchus, and this straight and stiff instrument passes it and goes off more to the left. I shall try to keep more directly downward to the median line. It strikes a hard substance, and I have opened and grasped something, but it gives so little on traction that I am beginning to fear something else is grasped: however, it yields finally, and here is the shell. I was prepared to see something small, supposing it to be a small pistol-cartridge cap, but we have here a rifle shell (one and a fourth inches long by three-eighths of an inch in diameter). The fact that the closed end was downward and wedged so tightly into a secondary bronchus that a very distinct pull was necessary to dislodge it accounts for the physical signs of a part of the left lung undergoing consolidation and the extensive emphysema. I tie the retracting threads across, pulling the laryngeal incision together, and pack a little gauze into the outer incision. It might do to close both wounds, but, as considerable dirty bronchial secretion is being raised, it is perhaps better to dress it once in this open manner, and after two or three days the external wound may be pulled together.

[The boy rapidly recovered, leaving the hospital eight days later. Fig. 4 represents the boy at the first dressing, three days after, with the forceps and shell held in approximately the direction from which the latter was removed, but the shell is represented about one inch too high. The emphysema had all disappeared.]

A "SUCCESSFUL" CÆLIOTOMY REVIEWED.

Our next case, now being etherized in the anteroom, is in many ways an exceedingly instructive one. It ought to impress on your minds a fact too often forgotten,—that operating is not necessarily the *summum bonum* of surgery. To use the knife skilfully may be an important qualification of the surgeon, but on the whole it is only one of many necessary accomplishments, and, I dare almost say, far from the highest.

I will read you the patient's anamnesis, as recorded by the house physician-surgeon. Alice S., American, aged eighteen. Father living, but has "lung trouble;" mother living, has "rheumatism and heart

trouble," four brothers, all living, three healthy, "one is sickly;" two sisters, one "pretty healthy," but the other had "bad spells" and died at twenty-four; does not know the cause. The patient when nine years old fell from a horse, soon after which there was a slight flow of blood from the vagina. At fourteen she had typhoid fever, followed by inflammation of the stomach and bowels. She began to menstruate at fifteen, and during her sixteenth and seventeenth years she was irregular. She subsequently had a tape-worm removed, and she thinks that the head still remains and is growing. She had severe pains in the ovaries, and "bad spells," and in November, 1892, she had both ovaries removed. She was then in Kansas City. After this she was very well until September, 1893. Since then she has had severe pain in the uterus and the ovarian region, and, she says, severe irregular flowing: she states that it continued once for ten weeks. She has come here to have the uterus removed. This is all very indefinite; but let us study it in conjunction with her physical state and her condition while in the hospital, as observed by disinterested parties. She was present two weeks ago, anxious for immediate hysterectomy; but I would not think of judging of her case on so short an acquaintance. As she comes before you it is at once evident that the patient appears in excellent physical condition,—well nourished, of ruddy complexion, muscles firm and strong. The expression of her mouth "is that of a stubborn and bad disposition." Her appearance certainly belies any genuine martyrdom to pain or exhausting hemorrhage. During her two weeks in the hospital her appetite has been very good; bowels regular; there has been no uterine flow, and her demeanor has been somewhat irregular, at times crying from pain, at others, when interested in some novelty in surroundings, very jolly, but on interrogation always suffering. On the third day of her stay with us she had one of her "bad spells," the first since her operation. She became unconscious, breathing almost stopped; after a few minutes she came out of it, with no biting of the tongue or frothing at the mouth.

An anæsthetic has been given in order to make a thorough pelvic examination. In obscure cases the relaxation of anæsthesia enables us to make a very accurate bimanual palpation of all the pelvic organs, and I would impress upon you the great advantage of resorting to it in most cases in which the ordinary examination leaves you in doubt. In virgins, too, a proper examination when necessary is made with less pain, more success, and less shock to modesty, by giving an anæsthetic. The cervix is found to be lacerated, presumably by some dilating operation. The uterus, normal in size, is normally located and

movable, except that the fundus appears to be somewhat attached by adhesions behind the pubes, and I should judge that a hysteropexy had been performed when the ovaries were removed. There are no discoverable thickenings or exudations about the pelvis. A curette is carried into the uterine cavity, and the interior is, so far as I can discover, healthy. That is all I wish to do with the patient. She may be removed while we consider her case. If her uterus is to be removed, I prefer that some one else shall do it.

Now, I am very suspicious of patients presenting so much complaint and so little discoverable organic disease. Sometimes shiftless families with insufficient healthy exercise of body and mind all "enjoy poor health." A young lady, very miserable in appearance and full of trouble, brought to me a long story of medical treatment. After considerable observation tending to show a large neurotic element in her case, a sister, equally miserable, came with her. I then said to her, "Is it not a fact that your whole family habitually spend most of their energies in being sickly and in complaining?" She confessed that it was a family trait, that the mother had always been ailing, and that the various ills to which women are heirs were the chief topics of consideration. The whole atmosphere in which she had lived had been one of dyspepsia, nervousness, and complaint. The advice to quit medicine and to go to live out of doors with some healthy and sensible persons for six weeks worked more benefit than she had before experienced. This was accomplished only by chance, as such sufferers are generally inseparable. They ordinarily believe that they cannot live apart, and advance a multitude of reasons for this belief. The one cannot get along without the other. Now, as to the girl who has just gone out, she may suffer with pain and excessive and disturbed menstruation from the fixation of her uterus. I take it that she was a neurotic girl of wild and untrained emotional and mental make-up, probably with uterine displacement. That she was well for a time after her ovaries were removed was probably due to a temporary change of her circumstances rather than to the operation. Then a change comes over her capricious dreams, and she again becomes an interesting invalid. I would not say that the adhesions of her uterus may not cause pain, but it may be questioned whether releasing these for new ones to form will make matters better. All that I know is that one of the greatest abdominal surgeons in the world, after telling us that the uterus cannot be hitched up like a horse, very skilfully released the adhesions in a similar case, but the patient pursued the even tenor of her complaints just as before. After a very limited

experience in fastening retroflected uteri to the anterior abdominal wall, I have decided to do so no more. I shall advise this girl to live properly and let medicine and surgery alone.

Perhaps I ought not to say much of this case, as I have little to do with strict gynæcology. The abdominal work within my experience has been chiefly for everything else rather than for tubal and slight ovarian troubles; but the score or two of stray cases of this kind which I have operated upon, as well as those examined after operation by others, have taught me some unpleasant lessons, which I give for what they may be worth. One is, to have nothing to do with such operations for neuroses, or in persons not presenting very distinct and dangerous organic diseases, and to be especially shy of women with a maximum of complaint and a minimum of discoverable cause or objective symptoms. Some seven years ago I saw a woman in consultation who had been long invalided. I could discover little wrong with her ovaries. (They were somewhat enlarged and full of small cysts.) With some hesitation I consented, on the advice of several consultants, to remove them. For a time she did well; then came a family unpleasantness, and she stepped back into her bed. Then she wrote me, describing terrible pains and "bearing-down sensations," and wished me to remove her uterus. I wrote her frankly that I had become wiser, that her trouble was more in her head than in her uterus, and that the sooner she put her trust in philosophy and sense rather than in medicine and surgery, the better for her and for all concerned. Since then I have learned that she has been several times "cured" by mind-cures and other humbugs less troublesome and quite as successful as cœliotomy in such cases. This class of cases no longer "fool" the initiate. A larger class are those with more or less organic tubal and pelvic disease, but with complaints out of proportion to the organic trouble. Possibly operations are here justifiable, but the results are not very prompt, to say the least. It has been my observation that they often offer about as much complaint for a few months or years after operation as before. In other words, they run about the ordinary course of the trouble with which they are affected, unless, forsooth, new ones are superadded by some accident of the operation.

In a field in which I feel more competent to speak I meet with men cranked on the subject of their genitals. There I feel competent to say that the trouble is often chiefly or solely the result of self-introspection. In the majority of cases the trouble is much more largely mental, nervous, and dyspeptic than local; and only rarely is the disease chiefly a local one. It is certainly not rare to meet with dyspeptic or neuras-

thenic women who, by suggestion, have come to look upon their wombs as the source of all their woes, even such as arise from such diverse sources as bad habits, jealousy, overwork, abuse, prostration from various acute and chronic disorders, or what not. Occasionally we meet with morbid individuals wholly occupied with introspection, who are so intensely concentrated upon self that they make an industry, as it were, of being ill. Classify it as we may, or build what fine theories we will, the practical fact remains that the best cure is to have them early launched upon the bark of self-support, with no one to lie down on, equally unfed by misplaced sympathy and unirritated by unjust abuse, but stimulated by rational and just kindness, and surrounded by a sane physical, mental, and moral environment. A system of treatment is perhaps of more importance than *the* system. If good sense could be furnished on prescription to such sufferers and those around them, the management of such cases would be much easier and more effective than it is at present.

[NOTE.—The girl was very buoyant in spirits, even happy, after her “operation,” until her departure a week later. She inquired if she was in a condition to marry. She shortly turned up for treatment at the office of another physician whom she had met at the hospital. She reported her appetite poor, but her looks and a relative denied it. There was now a moderate bloody flow from the uterus, probably menstrual, as it is not very rare in my experience for menstruation to continue after complete removal of the tubes and ovaries. She declared that she was engaged to be married, but would not wed until she was properly cured and in good condition. During all her complaints diversion of her attention brought a momentary laugh, and the points of greatest tenderness, on examination, were very indefinite and changeable.]

Genito-Urinary and Venereal Diseases.

TUMORS OF THE BLADDER.

CLINICAL LECTURE DELIVERED AT THE GENERAL HOSPITAL, BIRMINGHAM.

BY GILBERT BARLING, F.R.C.S.,

Professor of Surgery in Mason College, England.

GENTLEMEN,—Cases of tumor of the bladder present themselves somewhat infrequently, and, as we have at present a patient just recovering from an operation for this condition, I take this opportunity to discuss the matter with you to-day.

Let me first appeal to my note-books for reports of past cases. One of the most remarkable occurred some years ago, when I was resident surgical officer at the hospital.

A young man, aged sixteen, first came under my notice in June, 1881, when he gave a history of hæmaturia, intermittent in character, extending over a period of ten years. During that time there had been intervals of months, weeks, or hours in which no bleeding occurred. The attacks arose without any definite cause, and they disappeared as suddenly. Clots had been seen in his urine, and when pressed the patient called to mind that he had passed "bits of gristle" with sharp pain. On admission he was suffering from an attack of bleeding of great severity, the urine having been almost the color of porter for about a fortnight; he was very exsanguine, suffered from dyspnœa with the least exertion, and had fainted eight or nine times recently. On one occasion before admission he was unable to pass any water for nearly two days, and obtained relief by jumping into a very hot bath: this was the only occasion on which retention had occurred. Pain was not a marked feature in the case, but there was some felt during and after micturition, and it was situated in the hypogastrium and perineum. Sounding revealed nothing, and frequent examination of the urine showed blood only. No definite diagnosis was arrived at, but during the next year the patient was kept under observation, and on July 31, 1882, he was readmitted for hæmaturia. During this time every

medicine which has any repute as a hæmostatic was used, but without any evident advantage. Constant search was made in the urine every day for fragments of a suspected neoplasm, and on August 7 a piece of tissue the size of a large hazel-nut was found, and this examined microscopically showed that it had been part of a fimbriated papilloma. The diagnosis now being cleared up, Mr. Jolly, the surgeon in whose care the patient was, performed a median perineal section, and removed with nasal polypus forceps, ring forceps, and scoop a number of polypoid growths scattered widely over the bladder. The patient left the hospital well about six weeks after. Three years later he was readmitted with hæmaturia of slight severity, which had occurred several times during the previous three months. Perineal section was again performed, and a small quantity of simple papillomatous growth was removed, the patient again making a good recovery. I made inquiries about him again three years later, when he presented himself for examination in thoroughly robust health, free from hæmaturia, but with an occasional pain at the end of micturition. This patient was treated in this way during what might be called *pre-cystoscopic* days.

The next case is one of a similar kind of growth, but, occurring much more recently, was much more easily and earlier diagnosed. A man, aged forty-five, was admitted to the hospital under my care on January 14, 1892, with a history of hæmaturia for the first time nine months before. At that time he had noticed a quantity of blood in his urine for about forty-eight hours, and this was associated with a certain amount of pain; six months later he had a similar attack. On admission there was a considerable quantity of blood in the urine, generally mixed equally with the urine, but on the last occasion of voiding the blood appeared only at the end of micturition, and pain of a smarting character was felt at the base of the penis; there was slight increase in the frequency of micturition. On January 18, the urine being quite free from blood, the patient was examined with the cystoscope, when a branching delicate papillomatous growth was seen on the floor of the bladder, just behind the trigone and close to the orifice of the right ureter. Its fimbriæ were of a delicate pinkish color; there was no solid formation, no ulceration or necrosis; a pedicle was not seen. A week later, suprapubic section was performed and the tumor found to be attached by a single delicate pedicle close to the right ureteral orifice. The pedicle was divided with scissors, and there was hardly any bleeding: the wound was healed in three weeks. I learn that the patient remains quite well. I show you this patient's

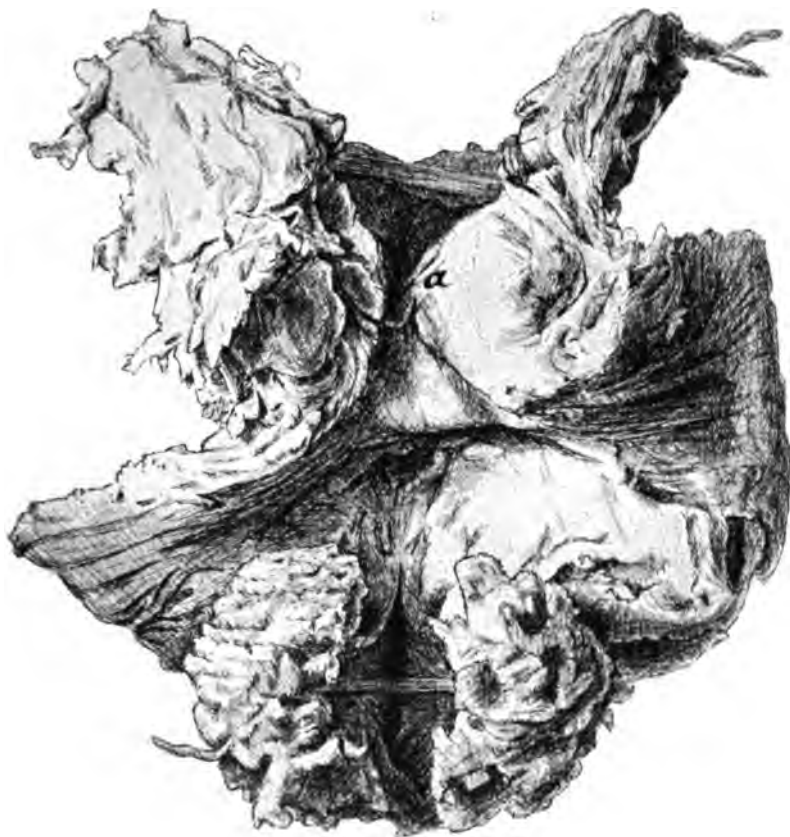


FIG. 3.—Fibro-papilloma of the bladder removed by suprapubic section, divided and held apart at *a*.

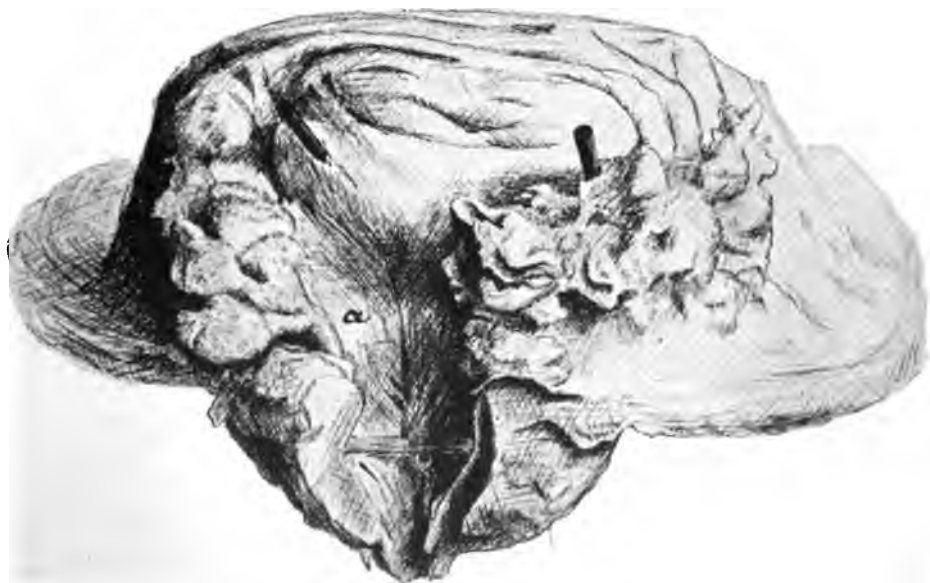


FIG. 4.—Multiple tumor of the bladder—fibro-myxomata (*a*).

tumor (Fig. 1), and a specimen (Fig. 2) which illustrates a similar growth: this is multiple and could have easily been dealt with.

The next case I wish to mention is a patient now in the hospital. She is a woman, aged thirty-two, married six years, but never pregnant, and suffered a first attack of hæmaturia a little more than three years ago; this was followed speedily by frequent and painful micturition. The bladder was sounded at another institution, and, no stone being found, it was washed out several times, which gave relief. The patient remained fairly well until three months ago, when blood again appeared in the urine and severe pain after micturition also came on.

FIG. 1.



Polypoid tumor of bladder removed
by Mr. Jolly.

FIG. 2.



Polypoid tumors of bladder.

On admission the patient was very anæmic, emaciated, and cachectic; the urine contained a good deal of matter, but no appreciable quantity of blood, only occasionally a few drops of blood appeared after micturition. She passed urine every hour, day and night, sometimes even oftener, and there was pain in the urethra before, during, and after the act. On October 19, on examination with the cystoscope under an anæsthetic after gentle irrigation of the bladder, I found an almost complete collar of papillomatous growth surrounding the internal orifice of the urethra. The growth extended from this backward along the floor and up the left side of the bladder, where there was a

raised patch of considerable size, in the centre of which was a dead yellowish-white patch looking like a piece of necrotic growth. Examining bimanually, an elastic tumor of considerable size could be palpated between the two hands. It did not appear to infiltrate the walls of the bladder, nor was there any fixation of the pelvic tissues. October 30, suprapubic section was performed and a growth the size of a small orange, sessile on the bladder wall, but not indurated, was removed with various forms of forceps and scissors. A considerable amount of blood was lost, but there was no difficulty in controlling the hemorrhage by hot douching and sponge-pressure. The patient did fairly well till November 1, when she had pain in the lower part of the abdomen, which was tender, rigid, and distended; there was frequent vomiting, with quick pulse and anxious face. Peritonitis being diagnosed, purgatives and turpentine enemata were freely administered, and, though the bowels did not act, flatus was voided, and by November 5 all threatening symptoms had passed away. Convalescence was interrupted, however, by two terrible attacks of pulmonary embolism on November 7 and 8. For three days the patient's life was in the greatest jeopardy; but from that time till now she has made a steady recovery. Her wound is now healed, she holds her urine from three to four hours, she has hardly any discomfort, there is no blood in the urine, and she has gained flesh rapidly, so that you can have no conception of the wretched condition she was in before operation. Examination of this growth shows it to be a fibro-papilloma, and I have here a specimen (Fig. 3) which illustrates this form of growth extremely well. It shows the base or pedicle of the tumor separated into two halves, which blend intimately with the coats of the bladder.

These three cases, then, may be taken as typical of the tumors spoken of as papillomata, which afford us the most successful and satisfactory cases for operation. The great feature of these, dwelling on their symptoms, is hæmaturia, though you will observe that in the more solid growth in the third case symptoms sometimes described as bladder irritation speedily followed.

Let me now very briefly mention to you a case of another innocent form of tumor to contrast with these, in which the main symptom is irritation of the bladder,—that is, pain and frequent micturition. This is an example of fibro-myxoma, and I show you the specimen (Fig. 4). A male, aged four, was admitted to the hospital with almost incessant micturition and great pain and in a very emaciated and cachectic condition. Blood had not at any time been seen in his urine, but on

one occasion he passed by the urethra a small substance which looked like a black grape. Sounding detected no stone, and from the passing of some foreign body it was surmised that there might be a tumor in the bladder. The wretched condition of the child forbade any exploratory operation, and he died in a few days. The post-mortem examination revealed a patch of polypoid growth attached over a surface two and a half inches square, spread over the posterior and inferior walls of the bladder. Some of the growths had narrow pedicles and were as large as the end of the finger, others were much smaller and sessile, the mucous membrane around being like thick wash-leather. To the naked eye the tumors looked when fresh like nasal polypi, and it could be seen that they were connected only with the mucous membrane, which could be stripped off, leaving the other coats healthy. The specimen shows the general appearance of the tumor. There are a few other tumors, fibromas, myomas, and dermoids, which have a history similar to this.

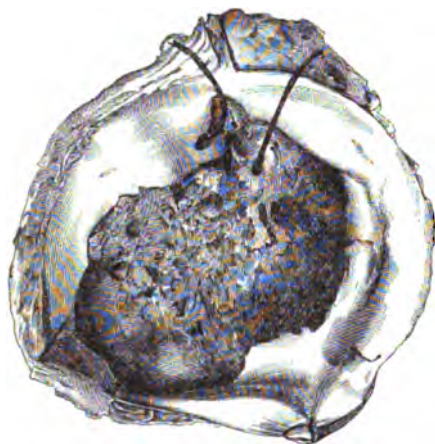
Let me now relate a case to illustrate another clinical variety of bladder tumor, a malignant form.

A male, aged fifty-one, was admitted to the hospital on May 16, 1892, complaining of difficulty in passing water and of pain under his penis after he had passed it, and of clots of blood in his urine. His history showed that he had passed blood for the first time three years before, and at intervals of varying length ever since. Some time later he had pain and frequent micturition, but he was quite certain that the hæmaturia preceded the other symptoms. The pain now is at the end of the penis when he passes water; he also has pain in the loins. The frequency of micturition is both by day and by night. Examination with the cystoscope showed a wide-based growth attached to the floor and posterior wall of the bladder; this was ulcerated in the centre. The finger detected thickening and infiltration in the floor of the bladder. The growth being diagnosed as malignant, the patient was advised not to have an operation done unless his symptoms of pain and frequency of micturition became more severe. In about a month he returned begging for relief from his pain and frequency: so on July 4 a suprapubic cystotomy was done, and the growth scraped away down to its base with a sharp spoon. In three weeks all the urine was passing by the urethra, the patient was free from pain, and the frequency of micturition was much less marked than before the operation. On July 31 the wound, which had quite healed, broke open again, and from this time on there was a steady increase of pain, frequency, and loss of condition. The first week in September there were rigors and

vomiting, and masses of growth began to project through the suprapubic opening: the patient died at the end of September. The post-mortem showed that the whole cavity of the bladder was filled with a growth which had involved the tissues of the wound. Both ureters and kidney pelves were dilated, and both kidneys were in a state of pyelo-nephritis. Microscopically the growth was an alveolar carcinoma. The photograph (Fig. 5) of an epithelioma shows the flat, thick-edged, sessile tumor which is characteristic of malignancy.

These cases illustrate, then, the three chief groups of bladder growths, —the innocent group, which chiefly gives rise to hemorrhage; the second

FIG. 5.



Epithelioma of the bladder.

innocent group, in which hæmaturia is slight or passing, and pain and frequent micturition are the chief features; and the third group, the malignant, in which painless hemorrhage is nearly always the first symptom, though it is speedily followed by painful and frequent micturition.

When a patient presents himself or herself with symptoms suggestive of bladder tumor, we have by careful investigation to determine the presence of a growth, and, if possible (and it generally is

possible), whether that growth is innocent or malignant, and how it is to be dealt with. In arriving at a diagnosis we weigh the signs and symptoms presented, and we resort to physical examination. I propose to consider the various points which present themselves for investigation, and the first I shall deal with is *hæmaturia*. You will appreciate the importance of this symptom when I tell you that in seventy-five per cent. of all cases of tumors of the bladder hæmaturia is the first symptom. Other symptoms may arise later on, but in many papillomata there is no other indication of the presence of a tumor. The hæmaturia may be slight, or severe, so much so as to make the patient quite faint if he gets out of bed, as in the first case I related to you, but the amount of bleeding is no criterion as to the size of the tumor. In one patient, between sixty and seventy years of age, upon whom I operated, there was a severe attack of hæmaturia lasting nearly eighteen days, and yet

the papilloma which gave rise to it did not weigh altogether a drachm. One feature, which in a certain number of cases differentiates the hæmaturia of tumors of the bladder from that caused by other conditions, is that the bleeding may take place only towards the end of the act of micturition, or at all events the amount of bleeding is much increased then, owing to the obstruction of the venous return from the growth, or else to the actual involvement of the growth in the urethral orifice. In a certain number of cases of papilloma the intermittent hemorrhage unaccompanied by other symptoms (unless there be slight increase in frequency and some pain due to the passage of clots) is most characteristic, and is paralleled only by the bleeding which occurs in some few cases of malignant growth of the kidneys. Besides being intermittent and symptomless, the hemorrhage in the cases I have just alluded to is capricious: it comes without apparent cause and disappears in the same way; it is practically uninfluenced by drugs; it may last an hour, a day, or a week, and the intervals between the various attacks are just as uncertain. Such hemorrhage as I have been speaking of may be present in any malignant growth of the bladder, but at the end of a few months pain and frequent micturition, often due to cystitis, arrive, and trouble the patient much more than the bleeding. This is not always so in malignant growths, and depends to some extent upon the nature and situation of such growths; for instance, I operated upon a patient in pre-cystoscopic days, in whom for two years intermittent symptomless hemorrhage had occurred suggesting papilloma, but on opening the bladder I found at its vertex an ulcerating growth of limited extent, which proved to be a typical scirrhus carcinoma, a growth very rarely seen in the bladder. The absence of pain and the frequency of the hemorrhage were doubtless due to the growth being situated in a locality distant from the usual one—the floor of the bladder.

Pain and frequent micturition are often merely the indications of cystitis, which comes on early in malignant growths and in the firm innocent growths, such as the myxoma I mentioned to you. Cystitis is not common in connection with papilloma, though it may arise when the growth has existed for some time, perhaps not till the end of years. Patients with the more solid forms of papilloma, however, as, for example, the case of fibro-papilloma I related to you, may early suffer from cystitis and its results, pain and frequency. When pain is present it is most often associated with the act of micturition, and is especially felt towards the end of the penis. It may, however, trouble the patient at other times, and may be felt in the perineum, in the rectum,

and down the thighs, or it may be experienced as a dull ache above the pubes. It is always necessary to ascertain whether the pain is due simply to the passage of clots along the urethra; otherwise a wrong conclusion may be drawn from it. The frequency of micturition is very variable, sometimes only a moderate increase on the normal state, at others so frequent that the patient's rest is constantly broken by it, and at last life may become unbearable from the incessant demands to empty the bladder. With regard to frequency it must be borne in mind that the presence of blood from an innocent tumor may cause some increased frequency, which passes off as the hemorrhage subsides, and must not be misinterpreted as meaning that a more formidable growth exists. Pain and frequent micturition, usually *secondary* to hemorrhage in their appearance, may be the *earliest* symptoms, and if so they suggest an innocent tumor of solid formation, or a malignant growth.

Retention of urine may occur from a portion of growth becoming impacted in the internal orifice of the urethra, as happened in the first case I related to you. In the same way the patient may suffer from a sudden interruption of the flow of urine when he is micturating, as does a patient with stone, owing to the foreign body corking the urethra and then being displaced, when the urine again flows. Sometimes dribbling of urine may occur, either an overflow or a true incontinence. The first is due to an over-distended bladder with growths in its orifice, by the side of which a little urine manages to escape; the second may be due to absolute inexpandibility of the bladder from infiltration of the growth in its walls, or in the female to a massive tumor, such as a fibroma, being gradually forced through the urethra, sometimes until it appears externally.

When a tumor is suspected, the urine should be constantly examined for the presence of fragments which may be passed, as occurred in two of the cases I have mentioned to you: this accident is most likely to occur in papilloma, but it may occur in any kind of tumor. To detect fragments, all the urine the patient passes, especially when an attack of bleeding is on, should be carefully collected every day, and the surgeon himself should pour it from one vessel into another, looking carefully in any sediment which may remain, and, if necessary, breaking up any clots of blood which may hide what he is seeking for. It is, of course, impossible to overrate the value of the evidence which a fragment gives as to the *presence* of a growth, provided it is examined by a person competent to give an opinion upon it under the microscope,—to show, in fact, that it is not an accidental foreign body. When it comes to the *nature* of the growth, however,

it must not be concluded that the tumor in the bladder is of the same nature as the fragment which has been shed. The fragment is no doubt most commonly of the same nature as the bulk of the tumor, but to this there are many exceptions, and from the surface of malignant growths fragments may be separated which, examined microscopically, are nothing more than simple papilloma. Again, do not commit yourselves to a diagnosis of malignant growth because of certain irregular shaped and sized epithelial cells in the urine, which occasionally betray the inexperienced into speaking of them as "cancer-cells." From the urinary passages generally very various epithelia may be shed, and the knowledge of this should put us on our guard.

Thus far I have been speaking of the information to be obtained by interrogating the patient and by examining the urine. I now come to what may be learned by physical examination. The first method resorted to generally is the use of the sound. The evidence obtained by this instrument is usually negative,—that is, we learn that there is no stone present to cause the symptoms, and we may learn nothing more than this; on the contrary, though no stone may be found, irregular solid projections may be recognized, and subsequently sharp hæmaturia may follow, showing that some growth has been abraded by the sound. When the instrument is in the bladder, the finger introduced into the rectum may recognize thickening and infiltration about the base of the organ. Objection has been taken to the use of the sound in the diagnosis of tumor of the bladder. When the chief symptom is hemorrhage, such as suggests papilloma, I never trust to sounding to tell me anything, but resort to the use of the cystoscope forthwith. When the symptoms are mainly pain and frequent micturition, the exclusion of stone is the first business, and then the sound must be employed, and this, of course, is especially true where cystoscopic examination cannot be provided. Bimanual examination should also be instituted, to tell the physical character of the growth if it may be learned in this way. With one hand above the pubes, and the fingers of the other in the rectum or the vagina, according to the sex of the patient, a tumor of any consistency and size may be recognized if the patient is under an anæsthetic. This method of examination will also tell whether a tumor infiltrates the floor of the bladder, giving a dense leathery nodulated feeling, and whether it fixes the lateral walls of the bladder to adjacent parts, either of these conditions, of course, indicating malignancy.

And now I must point out the value of our modern instrument the electric cystoscope. This, like other instruments of precision, as

the laryngoscope and the ophthalmoscope, is limited in its utility, (1) by the conditions present which facilitate or prevent thorough examination; (2) by the skill of the individual observer, who must be able to interpret correctly what he sees. In the adult with normal patency of the urethra, there is no difficulty in introducing the cystoscope into the bladder, even when there is considerable enlargement of the prostate. When an examination is attempted, the fluid in the bladder must be free from blood and pus, either of which even in small quantities obscures the field, and nothing is learned. It is hardly necessary to say that before the cystoscope is introduced care should be taken to see that the battery is working efficiently, that the lamp is secure, and that all the connections are perfect. All the above conditions being complied with, we may learn first of all that a tumor is present, perhaps how it is attached, whether by a pedicle or otherwise, the exact site of the attachment, whether the growth is ulcerated or not, and, with some degree of probability, whether it is innocent or malignant. The more distinctly pedunculated a tumor is, the more likely it is to be innocent; the more delicate its papillæ, and the more they are localized to one part of the bladder, the greater is the presumption of innocency. When the tumor is sessile, when instead of delicate papillæ we have raised bossy masses giving the appearance of a solid œdema, and especially if there is ulceration, the indications point to malignant growth. Summing up the value of the cystoscope, under *suitable* conditions it is impossible to overrate it. Its great virtue is that it tells almost with absolute certainty whether a tumor is or is not present. I said that the value of this instrument, when it is really available, cannot be overrated, and I emphasize this by pointing out to you five conditions which are most likely to be confounded with tumors of the bladder, and in which exclusion of tumor is of the utmost importance: these are sarcoma of the kidney, stone in the kidney, granular kidney with severe hemorrhage, tuberculosis of the kidneys commencing, as it occasionally does, with severe bleeding, and hæmaturia in a hæmophilic subject.

Treatment.—Whether this is to be operative or not will depend upon the opinion formed as to the nature of the tumor. If it is believed to be innocent, it should be removed if the patient's general condition permits. If the characters are distinctly those of a malignant growth, as a rule operation is not called for; the exceptions to this rule will be dealt with later.

As a very large proportion of tumors of the bladder are located on the floor and parts adjacent, it seems at first sight reasonable to

approach them by a perineal opening; but this method is deservedly falling into disuse. In elderly men with deep perineums, the finger introduced by a median opening may fail to recognize the presence of a growth, because the tip of the finger only just reaches into the bladder. Even when the finger can fully explore the viscus, the repeated introduction of fingers and instruments through the perineal opening, with the unavoidable bruising and laceration of the parts, renders the operation, in my opinion, more serious than suprapubic section, which should be the routine method adopted. This, when the patient is in the Trendelenburg position, gives free access to the bladder-cavity for the manipulation of instruments, and especially so if the attachments of the recti are divided, and by the introduction of retractors or of a large Fergusson's speculum, and the aid of electric light, the tumor may be exposed to direct observation. It is not necessary for me to dwell upon the details of the suprapubic section, with which you no doubt are all familiar from seeing it done so often here.

The bladder being opened, various instruments may be used to remove the growth. If it has a slight pedicle, it may be snipped off with scissors curved on the flat, or it may be evulsed with nasal polypus forceps. If its base be more solid, but still pedunculated, it may be snared with wire, and this may be more effectually done if a perineal opening be made through which the snare can be introduced, the fingers above the pubes manipulating it round the base of the growth. For tumors such as the fibro-papilloma of Case III., Thompson's forceps for evulsing the tumor in fragments are useful.

If the tumor has been diagnosed as malignant, an operation is called for under two conditions: the first is when the growth is so limited in extent, and located in such a part of the bladder, as to justify the belief that it can be extirpated completely. The other condition is when a tumor too extensive to be completely removed is yet causing the patient so much distress, from pain, frequent micturition, and bleeding, that some relief has to be given to make life bearable.

I have now only to say a few words as to the prognosis of bladder tumors. Complete and permanent cure by the excision of a malignant growth is so rare that it need scarcely enter into our calculations. At the same time it is necessary to remark that the progress of many malignant growths is slow, the mean duration being about three years, and the tendency to secondary infection of the viscera and glands is slight. The prognosis in papilloma is better than in any other form of tumor, but cases accurately recorded show that occasionally a papilloma becomes carcinomatous, as, for instance, one published by Mr. Alexan-

der in the *Lancet*, vol. xvii. p. 8, 1878. More important than this rare occurrence is the tendency of the firmer papillomas to recur. This will, I expect, be the case with the female patient whom I have shown you to-day, and in such it not infrequently happens that two or three recurrences take place which can be removed, and then at last a recurrence so extensive is produced as to be beyond relief by operation. In a case such as the second I related to you the prognosis is extremely good. Cases are occasionally recorded of papilloma of the bladder and of some of the other innocent forms going on for many years; for instance, in the first case I described to you, symptoms had existed for ten years. It may not unreasonably be asked, why interfere with tumors which seem to have the capacity of doing so little harm? The answer is, that almost invariably secondary dilative and inflammatory changes are set up in the ureters and kidneys, producing hydronephrosis and pyonephrosis, which will eventually kill the patient, or will militate against a successful operation if the growth be left until a long time has elapsed.

**THE RESULT OF A PRETENDED OPERATION UPON
A PATIENT SUFFERING FROM A DELUSION OF
A SEXUAL CHARACTER; OPERATION FOR THE
CURE OF EPISPADIAS; CASE OF PERINEAL
SECTION FOR TRAUMATIC STRICTURE, WITH
A DESCRIPTION OF A NEW FORM OF PERINEAL
STAFF; NEW METHOD OF TREATING A RE-
SILIENT AND NODULAR STRICTURE OF THE
PENILE PORTION OF THE URETHRA.**

CLINICAL LECTURE DELIVERED AT THE JEFFERSON MEDICAL COLLEGE HOSPITAL.

BY ORVILLE HORWITZ, B.S., M.D.,

Clinical Professor of Genito-Urinary Diseases in Jefferson Medical College; Surgeon
to the Philadelphia Hospital, etc.

GENTLEMEN,—The first case that I bring before the class to-day is that of an individual who applied for relief at this institution five years ago. At that time he was suffering with spermatorrhoea dormientium, or nocturnal pollution, accompanied by well-marked neurasthenia. I call your attention to the case not only because it is one of great interest from a psychological point of view, but also because it illustrates what I have so frequently insisted upon when lecturing upon the treatment of individuals whose condition was similar to that of this person now before you; that is, that in order to benefit these cases every effort should be made to gain the confidence of the patient, and all your tact must be employed to allay his fears until the disordered nervous system regains its tone. You must ever be ready to meet all complications which from time to time will arise.

This individual is twenty-eight years old. He is a carpenter. When he applied to the surgical department of this hospital he asked to have his testicles removed, believing that it was the only way whereby the seminal discharges might be stopped, and saying that their continual recurrence was undermining his health, and that his reason would be

destroyed unless he was relieved. He stated that the various methods of treatment resorted to by numerous practitioners had all failed to benefit him. His condition had preyed upon his mind to such an extent that he declared that unless he could find some one who would be willing to castrate him, he would himself perform the operation. Six months previously he had attempted excision of the scrotum, but after making an incision his courage failed him. You may readily observe the scar resulting from this attempt at emasculation. The scars that you see on the body of the penis are the results of ulcerations produced by acids employed to render the organ sore, so as to make masturbation impossible. At the age of sixteen he had contracted the habit of self-pollution, which he had continued until the time of his application for treatment. He attributed his condition to this unfortunate practice.

His nocturnal emissions occurred as often as three times weekly ; he occasionally experienced pain along the course of the urethra, extending into the spermatic cords and testicles. He urinated with abnormal frequency.

He stated that his appetite was poor ; that he had a feeling of gastric depression ; that his sleep was neither sound nor refreshing. He was oppressed by heavy pains in the groin, lumbar region, and back of the head ; there was great mental hebetude ; he was easily fatigued ; his hand was unsteady ; he had an anxious look ; was markedly anæmic. When a seminal discharge took place it was followed by unusual depression and lassitude, with increased pains.

The urethra was intensely hyperæsthetic, especially the prostatic portion. The meatus was contracted ; there was no stricture. The prepuce was elongated.

The individual was placed upon full doses of bromide of potassium and fluid extract of ergot, atropine being given at bedtime ; hot douches were applied to the spine, and a bougie was passed every third day.

Under this treatment the emissions lessened in frequency, and, in fact, became normal ; that is, they occurred about once in two weeks.

The patient's mental condition remained unimproved, and whenever a seminal discharge took place he was plunged into the depths of despondency.

Observing that he was not improving mentally, and fearing that, unless some means was resorted to that would make a strong impression upon him, he would either become insane or do himself bodily injury, I resolved to perform upon him a pretended or bogus operation. Both



FIG. 1.—Epispadias, before operation.



FIG. 2.—Perfect union, nine days after operation.

the mother and the patient had frequently begged me to remove his testicles.

By means of anatomical plates, he was made to understand that absolute removal of the testicles was not necessary, but that the object sought for would be accomplished if the vasa deferentia were divided. It was furthermore explained to him, so that the delusion might be carried out, that after the operation he must expect that emissions would, from time to time, take place, which, however, would be only mucoid in character, and that whilst this discharge would simulate a nocturnal emission, it could contain no semen.

He was much pleased with the suggestion, and was glad to believe that the functions of the testicles could be destroyed without marked mutilation.

The parts having been properly prepared, he was etherized, and an incision three and a half inches in length was made over each abdominal ring, care being taken not to cut deeper than through the skin and superficial fascia. The wound was closed with sutures, and properly dressed. To produce greater mental effect, he was circumcised, and to control nocturnal pollutions, if possible, an application of a few drops of a solution of twenty grains of nitrate of silver to an ounce of water was made to the prostatic urethra.

He was kept in bed for the space of two weeks, that he might be fully impressed with the gravity of the operation. Doses of bromide of sodium and atropine were administered at bedtime.

After leaving the hospital he remained under my care for the space of four months. A full-size bougie was passed twice a week. He was placed upon the use of strychnine and the chlorides of gold and sodium, and an ice-bag was applied over the lower portion of the spine for one hour every night before retiring.

His neurasthenic condition rapidly improved. He gained in weight and in strength, and finally resumed his occupation, perfectly cured.

A year after all treatment had been discontinued, he called at my office in apparently perfect health, but looking very sheepish. After talking around the subject for some time, he stated that he had fallen in love with a young woman and wished to marry her, provided I could put him in proper condition by cutting down and fastening together the severed ends of the vasa deferentia. The exhibition of his inordinate joy, together with his astonishment, was very amusing when he understood that the ducts had never been cut, and that he could become a married man whenever he saw fit. He is now the father of two children and enjoys perfect health.

This patient suffered from intense hyperæsthesia of the urethra, brought on by excessive masturbation; the hyperæsthetic condition of the canal in time caused an irritable condition of the ejaculatory centre and an anæmic state of the lumbar portion of the cord, known as neurasthenia.

Now, as regards the treatment pursued. The first point was to remove the cause of trouble, by restoring the urethra to its normal condition. It will be observed that whilst the patient steadily improved physically, his mind remained in a morbid state: hence the necessity for producing a strong mental impression by the means already described.

After the operation had been performed and the discharges had been reduced to normal frequency, the condition of the nervous system was improved by the use of strong tonics. Castration in this case would have been not only barbarous, but criminal; the effect of the operation would not only have still further impaired his mental condition, but in all probability, from constant brooding over his mutilation, he would have either committed suicide or become insane.

EPISPADIAS.

The case that I next bring before you is of especial interest because of its great rarity. It is one of epispadias, the urethral opening being at the middle of the dorsum of the penis.

This patient is about seventeen years old. The penis is well developed, but the opening of the urethra is situated at the upper middle portion of the organ, instead of terminating at the end of the glans.

When he first applied for relief the glans was well-nigh solid, with only a urethral trough, covered with mucous membrane, marking the natural site of the urethra, besides which there was a marked upward curve of the organ. There are many theories advanced by writers as to the cause of this abnormal condition. I shall not take up your time by recounting them, but shall go immediately on with the case before us.

This individual has already had two operations performed on him before the class; the object of the first was to straighten the membrum virile; the second was to endeavor to form a canal from the epispastic opening to the extremity of the glans. To-day I bring him before you to complete the cure by changing the urethral-furrow into a tube. The parts have been made aseptic in the usual manner. The patient has been given ten grains of boric acid three times daily for the last three days, so that the urethra may be as nearly as possible in an aseptic condition.

For the purpose of denuding the skin and mucous membrane you will observe that I make use of an iris forceps and scissors. The forceps have the advantage of being light, and at the same time taking firm hold of the tissue which is about to be removed, without the possibility of slipping. I now freely denude both sides of the canal, and I wash the wound with 1 to 20,000 corrosive sublimate solution. Waiting a few minutes, until all hemorrhage has ceased, the abraded surfaces are brought together by means of a silkworm-gut suture, and the operation is completed by inserting a new thoroughly aseptic Nélaton catheter, which will effectually prevent the urine from gaining access to the wounded surface. The catheter and sutures will be removed on the eighth day. The wound will be dressed with sterilized iodoform and dry bichloride gauze.

To prevent erections, as far as possible, which would naturally have a tendency to impede union, full doses of bromide of potassium will be administered.

TRAUMATIC STRICTURE.

You will recall the case which I next present as one which I brought before you at the last clinic.

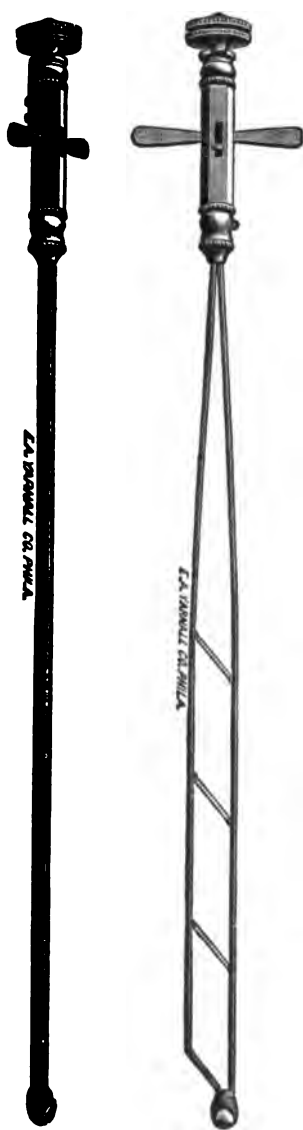
The individual is affected with a tight traumatic stricture of the membranous portion of the urethra. This condition was brought about, some seven years ago, by the patient falling from a height astride of a wood-horse and violently striking on the perineum. You will recollect that the calibre of the urethra was found to be very small, and that the stricture was tortuous: a filiform bougie could not be made to pass through.

I propose this morning to perform a perineal section by the method known as the Wheelhouse operation,—modifying and, I hope, simplifying it by substituting a staff of my own device, to take the place of that recommended by Mr. Wheelhouse.

You will observe that this instrument consists of two blades, in close apposition, which together form a smooth staff, with a thumb-screw at one end, by means of which the blades may be readily separated. The other end terminates in a hook, similar to that on the Wheelhouse staff.

The advantages claimed for this instrument are, that when it is placed in position, and the blades separated, the urethra is firmly fixed, and that the operator, after having made an incision through the skin, can open the canal with as much ease as he would an ordinary abscess. The fixation of the urethra prevents it from sliding from one side of the staff to the other, which is the objection to the Wheelhouse instrument;

especially is this slipping apt to take place when the tissues of the perineum are dense and fibrous.



Closed.

Open.

Newly devised perineal staff.

As soon as the canal is fairly opened, the blades must be brought into contact by turning the thumb-screw at the handle. The instrument is then adjusted, so that the hook presents in the perineal wound, and is to be clasped to the upper edge of the incision. The sides of the canal are now to be caught by means of a pair of hæmostatic forceps, and given to an assistant to hold. Thus, by tension made above and at the two sides of the open urethra, the strictured portion is drawn forward, so that it presents directly towards the face of the operator, who now attempts to pass through it a probe-pointed director; if he succeed, he incises the stricture on the floor of the urethra by means of a probe-pointed bistoury. The director having been removed, the instrument which I here exhibit, known as a Teale gorget, is inserted through the wound into the bladder, and serves as a guide for the passage of the catheter.

This patient having been etherized, he is placed in a lithotomy position; the staff, with the hook turned away from the operator, is passed gently down to the seat of the stricture, then withdrawn for the length of a quarter of an inch, so that I may open the urethra at a healthy point. My assistant now separates the blades, by means of the thumb-screw; this dilates, fixes the urethra, and at the same time makes it evident to the touch.

You will observe that I have incised the skin, and without the slightest difficulty carry the knife directly onward through the centre line, being very careful not to cut too far forward, lest I wound the artery of the bulb, nor too far backward, for fear of wounding the rectum.

The urethra has thus been opened between the separated blades, which are now closed and turned until the hook presents in the wound, and by elevating it in the manner here exhibited I catch the upper angle, and by means of two hæmostatic forceps fix the sides of the urethra. You will observe that the grooved director has found the opening of the stricture and has passed through it. I now divide the seat of coarctation by means of this probe-pointed knife.

The next step is to pass the gorget into the bladder; this being accomplished, a full-sized silver catheter is inserted and the gorget removed. The catheter will be left *in situ* until the perineal wound is closed, which will take place in from three to four weeks.

The incision will be irrigated with 1 to 20,000 bichloride of mercury solution, and the urethra will be washed out twice a day with warm water to which has been added boric acid. The catheter will be removed every third day, disinfected, and replaced. The incision will be dressed with iodoform and dry bichloride gauze.

[This patient made an excellent recovery, leaving the hospital on the twenty-sixth day, the wound being entirely healed. He was enabled to pass a 35 French bougie without difficulty.]

RESILIENT AND NODULAR STRICTURE.

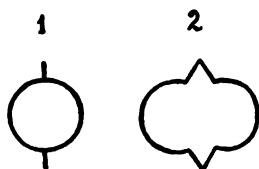
The next case that I bring before you is an individual thirty-two years old, apparently in good health. He is suffering from a resilient and nodular stricture situated three and a half inches from the meatus. Dr. Fleming, to whom I am indebted for this patient, tells me that he has repeatedly dilated the stricture so as to admit of the passage of a 32 French bougie, but that within forty-eight hours contraction takes place to so marked a degree that it is with great difficulty that an 18 French can be passed.

On examining the parts you will observe that a little in front of the peno-scrotal junction there is an indurated mass. This marks the site of the stricture. From what you have heretofore been told, when I have lectured on this subject, you will readily understand that the case before you is one upon which to perform internal and external urethrotomy.

With this operation you are already familiar. The indication for surgical interference in these cases of stricture is their irritable, resilient, or nodular condition.

Internal urethrotomy is primarily performed; then a perineal puncture is made, so as to put the parts at perfect rest and thus allow the indurated tissue to undergo fatty degeneration and absorption. Some

time since it occurred to me that this result might be produced by cutting the stricture on the roof and on the floor of the canal so as to produce a condition illustrated in these figures :



I conceived that instead of performing the perineal section the same effect might be produced by passing a full-size silver catheter and allowing it to remain in position for the space of at least two weeks, thus putting the parts at rest, and at the same time allowing them to receive the benefit of continual pressure

on the nodular mass surrounding the urethra.

I have twice performed the operation in this manner with perfect success, and I propose to repeat it before you to-day.

The urethra has been rendered as nearly aseptic as possible.

As I can only pass a filiform through the constriction, I will first, by means of Maisonneuve's urethrotome, proceed to cut the coarctation on the roof of the urethra. Having done this, I readily pass an Otis's urethrotome, by which means the stricture is divided on its floor. The canal is now to be irrigated with 1 to 20,000 corrosive sublimate solution, and a full-size silver catheter, which has been rendered aseptic by heat, will be passed into the bladder, there to remain for two weeks, removing it for a few minutes every day, so that it may be cleansed.

[At the end of two weeks the patient left the hospital, being able with ease to pass a 33 French bougie. The induration at the seat of stricture had almost completely disappeared.]

PROSTATECTOMY; IMPERMEABLE STRICTURE OF THE URETHRA; PROLONGED RETENTION OF URINE; PERINEAL SECTION.

CLINICAL LECTURE DELIVERED BEFORE A PRIVATE CLASS OF STUDENTS OF THE COLLEGE OF PHYSICIANS.

BY G. FRANK LYDSTON, M.D.,

Professor of the Surgical Diseases of the Genito-Urinary Organs and Syphilology in the Chicago College of Physicians and Surgeons; Fellow of the Chicago Academy of Medicine, etc.

GENTLEMEN,—I will present for your consideration this morning several cases of more than usual interest. The patient whom I first present to you is sixty-eight years of age, a tailor by occupation, and had always enjoyed excellent health up to four or five years ago. As you see, he is very young-looking for his age, and his nutrition is apparently perfect. Four or five years ago he began to be troubled with frequency of micturition, appearing in the manner characteristic of cases of this kind,—i.e., being of normal frequency during the daytime, but compelling the patient to rise several times at night to micturate. These symptoms progressively increased until about a year ago, when an attack of complete retention came on. This retention lasted several days without relief, overflow finally occurring. It was followed by a marked degree of vesical atony, which has persisted up to the present time. He is in such a condition now that unless the bladder is frequently emptied, extreme distention, followed by incontinence and overflow, will result. Infection has already occurred, and, as a consequence, the patient is suffering from a moderately severe chronic cystitis, the urine being somewhat ammoniacal. The bladder has been carefully explored for stone, but none has been found. Exploration of the urethra and bladder and the rectal touch disclose an immensely hypertrophied prostate, which is moderately painful on pressure. The enlargement is apparently diffused, and, although there are no definite symptoms of circumscribed obstruction at the neck of the bladder, I

should not be surprised if on opening that organ we found a posterior median hypertrophy. The extreme exaggeration and elongation of the urethral curve are strongly suggestive of a median enlargement.

The first duty of the surgeon in cases of this kind is to determine whether or not the kidneys are performing their function properly. It is necessary to determine whether albumin is present, and in what quantity. It is even more essential, if possible, to determine the amount of solid excrementitious matter thrown out by the kidneys during the twenty-four hours. For the estimation of this no complicated or minute analysis is necessary. Flint's rule, although a simple one, is as good as any that could be devised for practical clinical work. This method consists in estimating the total number of ounces of urine passed in the twenty-four hours, and then determining the specific gravity of the mixed urine. The last two figures of the specific gravity represent approximately the number of grains of solid material per ounce of urine. Simple multiplication shows, with a sufficient degree of accuracy for practical purposes, the number of grains of solid urine passed during the twenty-four hours. If the kidney is not performing its functions properly, there will be a relative decrease in the amount of urea. I find merely a trace of albumin, and no casts, in this old man's urine, and the amount of urea is approximately normal, yet I am still suspicious of renal disease.

The patient is desirous of having some radical operation performed, and in my opinion the case is more favorable for operation than the average case of the kind. The point I would impress upon you at this juncture is that, no matter how healthy the urine may appear in long-standing cases of chronic genito-urinary disease, particularly in enlargement of the prostate, chronic disease of the kidney may be inferred. Chronic obstructive, irritative, and infective conditions of the lower portions of the genito-urinary tract cannot exist for a great length of time without reacting with a greater or less degree of severity upon the structure and functions of the kidney. A functional aberration at first, and finally structural changes in the renal secreting tissue itself, make up the usual history of all cases of long-standing prostatic enlargement. Unfortunately, we have no accurate means of estimating the precise condition of the kidneys in chronic cases, and we oftentimes deceive ourselves in regard to the degree of tolerance for operative procedures which the patient is likely to present. The amount of albumin and casts in the urine is a very poor criterion of the condition of the kidneys in surgical affections of the genito-urinary tract. The estimation of the amount of urea, already suggested, is by far the most

accurate criterion for our guidance in determining the question of operative or non-operative treatment. I believe that in these cases a radical operation is warrantable. I have therefore suggested a combined suprapubic and perineal section. Precisely what will be done in this case will depend entirely upon what we find when the bladder is opened. The choice of routes by which we may enter the bladder in cases of this kind is much a matter of taste. For my own part, taking into consideration all the indications and contra-indications in these cases,—and these I shall not attempt to outline here,—I am inclined to prefer a combined suprapubic and perineal section. This operation, it appears to me, presents the following distinct advantages. 1. Easy access to and management of tumors, calculi, and enlarged prostatic lobes. 2. Drainage can be established for a few days through the perineal wound, thus giving the suprapubic opening an opportunity to become thoroughly glazed with plastic lymph, and thus protected from the infectious urine, which in these cases must always be regarded as toxic—sometimes intensely so. 3. Better control of hemorrhage. 4. More perfect drainage by two channels. Knowing, as we do, the great danger of infection by toxic urine, the feasibility of suprapubic section in two stages has suggested itself to numerous surgeons, primarily, I believe, to those of the French school. The operation of suprapubic section in two stages has erroneously been attributed in certain quarters to American surgeons, but it was in vogue in France, and, for aught I know, in other countries of Europe, long before it was performed in this country, or, at least, long before any report of such an operation was made.

In the case before you, I performed, three days ago, the preliminary operation of exposing the bladder. As you see, the parts are protected by the usual antiseptic dressing of gauze and iodoform. I propose this morning to open the bladder by both the perineal and suprapubic routes; and if I find conditions suitable for the operation I shall perform a prostatectomy. In a general way, my advice to you is, where there are no distinct indications for operation upon the prostate itself it is best to content yourselves with suprapubic section and drainage, or, perhaps preferably, a combined suprapubic and perineal section with drainage, leaving the prostate to take care of itself, which it usually does very satisfactorily, inasmuch as we find that even in the case of enormous diffused enlargements decided shrinkage of the organ occurs in a few days, and within a few weeks it is so reduced in volume as to produce marked and permanent improvement in the condition of the patient. We will give this patient chloroform instead of ether,

inasmuch as it is generally known that chloroform is the safer of the two in operations upon cases of this kind. It is perfectly practicable in these cases to open the bladder and even to perform a perineal section under the use of cocaine without resorting to general anæsthesia. I have done this in several instances, and with success. I will state that where the kidneys are known to be seriously impaired I do not think that an operation, if performed at all, should be done under general anæsthesia. The use of cocaine, I firmly believe, will reduce the mortality in certain cases to a very marked degree. Most surgeons use, in the performance of suprapubic section of the bladder, the Peterson or other apparatus for distending the rectum and raising the prevesical fold of peritoneum, thus gaining a larger space for the performance of section of the bladder. I find that rectal distention is rarely necessary. In cases of this kind in which the bladder is atonied and may be readily distended with a large quantity of fluid, and in cases in which retention is present and the bladder is raised to a considerable extent above the pubes, there is abundance of room for the operation. In cases in which the bladder is contracted and cannot be distended, the viscus may be readily exposed by the ordinary incision, and without danger to the peritoneum, if the posterior surface of the pubes be closely hugged by the finger in stripping up the prevesical fat.

The patient now being under the influence of the anæsthetic, we will proceed to open the bladder above the pubes. On removing the gauze with which the preliminary wound was packed, we find the wound in a perfectly aseptic condition. We will, however, irrigate it thoroughly with a 1 to 5000 bichloride solution and asepticize the surrounding area of skin by careful irrigation with the bichloride, followed by the application of absolute alcohol. I have had the bladder thoroughly irrigated before the patient came on the table. This was done with a warm boric-acid solution, and about sixteen ounces of the solution were allowed to remain in the bladder. To prevent the possible escape of the urine from the bladder through the urethra, the penis has been surrounded by a piece of roller bandage which compresses the urethra tightly. You will understand, of course, that the patient's rectum was thoroughly emptied before he came into the operating-room. The bladder being exposed, I make an incision into it with the bistoury, the back of the knife being turned towards the prevesical fold of peritoneum, care being taken not to cut or disturb the suspension sutures with which the bladder was fixed at the time of the primary operation. Withdrawal of the knife is followed by a gush of urine, which guides my finger into the interior of the bladder.

I would suggest that the first incision into the bladder be made very small, as the bladder walls, being elastic, will admit of the insertion of the finger through an opening much smaller than would appear sufficient to admit the finger. The precaution of a very small incision is particularly desirable where the incision into the bladder proves to be merely exploratory in character. On passing my finger into the patient's bladder, I find three distinct, circumscribed tumors at the posterior border of the prostate and jutting into the bladder. The lateral lobes of the prostate are immensely hypertrophied and constitute two of the three tumors which I mentioned. The third tumor is a distinctly circumscribed and almost pedunculated growth in the posterior median portion of the prostate. This growth must, it appears to me, have acted very much like a ball-valve in producing obstruction to the outflow of urine from the bladder. To make these tumors more accessible, I shall now make a median puncture of the perineum; this I do upon a central grooved staff. This perineal puncture does not complicate the operation particularly, and, as you see, is in uncomplicated cases very speedily performed. On withdrawing the grooved staff from the urethra, I substitute for it my index finger, so that I have succeeded in accomplishing the bimanual manipulation of the prostatic overgrowths. At this point I will inform you that while I believe it desirable to remove the hypertrophies in this case, I shall do so with as little cutting as possible. I introduce a probe-pointed bistoury, and, after incising the mucous membrane covering the median tumor, I succeed with the index finger and thumb in twisting the tumor entirely off. I now have it in my hand, and it presents decidedly the appearance of a myo-fibroma. An incision is now made in the mucous membrane covering each lateral lobe; the finger is next introduced into the opening over the lobe and the mass of prostatic tissue which it contains shelled out, as near as may be without any cutting, if it is possible to avoid it. I find that the prostatic tissue is friable and breaks down readily under my fingers, it being consequently necessary to remove it piecemeal. You will please remember that it is by no means necessary to remove every particle of hypertrophied prostatic tissue, because after an operation of even moderate thoroughness a considerable portion of the hypertrophy will speedily shrink down and cease to give annoyance. Having removed the hypertrophied tissue as far as possible, the question of drainage comes up. I prefer in cases of this kind a straight fenestrated tube of the ordinary quality of drainage tubing, but of good size. This is passed through and through the bladder from the upper to the lower wound. For the

first few days the urine may be compelled to run entirely through the perineal tube, thus protecting the suprapubic wound from infection. Flushing of the bladder is much more easily carried on by means of a through-and-through drainage-tube. You must remember, however, that it is necessary to have the upper tube tightly sealed, or else the urine will infect the suprapubic wound. In a few days it may be found advantageous to drain suprapubically. I shall order this patient put upon a generous and easily digestible diet, and in the way of medication I shall order ten minims of oil of eucalyptus four times daily. The oil of eucalyptus is in my experience the most reliable of all remedies for the prevention and treatment of so-called urinary fever.

IMPERMEABLE STRICTURE OF THE URETHRA; PROLONGED RETENTION OF URINE; PERINEAL SECTION.

The next case I present to you is a most interesting one. The patient is thirty years of age, by occupation a railroad employee. According to his statement, he has suffered from a deep stricture of the urethra for fifteen years. This has been treated with varying degrees of success at intervals during that period. He has had several attacks of retention, which were relieved by the catheter and were followed by cystitis. The patient presented himself to me yesterday suffering from retention of urine, with overflow. The bladder was distended to such a degree that it reached almost to the umbilicus. I found it impossible to enter the bladder by the natural route, and so was compelled to do a preliminary aspiration above the pubes. The urine which I withdrew was strongly ammoniacal, and contained a great deal of mucus. The patient, as you see, is in a bad condition generally, having but a few weeks since recovered from a severe attack of pneumonia. He presents the general cachectic appearance characteristic of those patients whom Guyon has so euphoniously termed *urinaires*. The cachexia incidental to cases of this kind is due to three causes: (1) the pain and irritation incidental to the chronic condition of urinary obstruction; (2) a moderate degree of urinary toxæmia incidental to perturbation of the function of the kidneys; (3) a certain degree of toxæmia produced by the absorption from the genito-urinary tract of the products of decomposing urine and chronic inflammation of the mucous membrane. These elements in the production of cachexia in *urinaires* must be taken into consideration, as it is of the utmost importance in deciding the question of operation, especially with reference to prognosis. They are too frequently lost sight of by the operating surgeon.

We are confronted, therefore, in this case with what may be truly

termed an emergency in genito-urinary surgery. This man's bladder must be relieved, and effectually so, else a fatal result will surely occur within a very short time. We are confronted with a strong probability of septic infection following the operation, on account of the highly toxic condition of the urine, which must certainly bathe the operative field the instant the bladder is reached by the knife. I will state that the patient has been prepared for the operation by the administration of oil of eucalyptus, as is my custom. The patient now being under the influence of the anæsthetic,—and by preference chloroform is administered, as I believe it to be safer in cases of this kind than ether,—I shall proceed to explore the urethra. It is very desirable to introduce a guide through the stricture if possible. This may often be done under the anæsthetic in cases in which prior to anæsthesia it was impossible to pass an instrument, however small. I find that even after careful manipulation with filiforms and small flexible bougies it is impossible to pass one through the stricture. We are confronted, therefore, with what we shall term, for the sake of clinical accuracy, a surgically impermeable stricture. That the stricture is permeable in the ordinary sense of the term is shown by the fact that urine has been constantly trickling away. Strictures that are truly impermeable are very rare; those that are surgically impermeable are not so rare.

We have the choice in this case of two procedures: (1) perineal section without a guide; (2) suprapubic section and retrograde catheterization combined with perineal section. We shall be guided somewhat by the conditions found during the operation. I shall attempt to perform the operation of perineal section without a guide,—the original operation as perfected by Syme and modified by Wheelhouse. The patient's perineum and pubes having already been shaved and made thoroughly aseptic prior to his being put under an anæsthetic, we are ready to begin the operation. As we cannot introduce a filiform through the obstructed portion of the canal, we do the next best thing possible, and pass a medium-sized sound down to the point of obstruction. I make an incision in the median line, following the *raphé* accurately until the point of the sound is exposed and the urethra freely opened just in front of the stricture, which is located at the bulbo-membranous junction. I find the urethra thickened, with considerable periurethral induration over the entire extent of the bulb. I now pass a couple of strong ligatures through the edges of the wound, including the skin, fascia, and edges of the urethra. These ligatures are looped and given to the assistant to hold. I now take the staff

from the hand of my assistant and turn its point out of the wound in the perineum hook-wise, which enables me to keep the upper part of the wound held well up. The tension upon the ligatures, the sound being hooked up well in the upper angle of the wound, gives me a much more capacious opening into the urethra and enables me to search for the opening of the stricture. Having exposed the face of the stricture, I find that I cannot pass any instrument, however small, through its lumen; in fact, I cannot even find the tortuous and extremely narrow channel through the strictured tissue. Three courses are now open to me: (a) to perform Cock's operation of tapping the urethra at the apex of the prostate; then, after entering the urethra, to dissect from behind forward; (b) to dissect carefully, guided by the sense of touch and my knowledge of the anatomy of the parts, in the direction of the neck of the bladder, cutting the cicatricial tissue by slight strokes of the point of the knife; (c) to open the bladder above the symphysis pubis and introduce a guide into the urethra from within outward. I confess I am somewhat partial to this last method of operating, and I think it will probably be the quickest solution of the difficulty in this case. You see, gentlemen, I have readily exposed the bladder above the pubes. I shall now incise it. My finger soon enters the bladder, and, guided by the finger, I pass a good-sized bougie into the vesical orifice of the urethra down into the perineum, which I find I can readily feel with the finger. I now have a distinct and positive guide to the urethra, and cutting upon the guide I find that I am enabled to pass my finger through the perineum and prostatic portion of the urethra into the bladder. I shall drain in this case, as I did in the previous instance, by a through-and-through tube.

The prognosis in this case is a little doubtful: still, it is surprising how some of these apparently desperate cases improve after operation.

Gynæcology and Obstetrics.

TRACHELORRHAPHY AND ADHESIONS OF THE RETROVERTED UTERUS.

CLINICAL LECTURE DELIVERED AT ST. LUKE'S HOSPITAL, CHICAGO.

BY HENRY T. BYFORD, M.D.,

Professor of Gynæcology, College of Physicians and Surgeons, Chicago; Professor of Gynæcology, Chicago Post-Graduate Medical School; Professor of Clinical Gynæcology, Northwestern University Woman's Medical School; Gynæcologist to St. Luke's Hospital; Surgeon to the Woman's Hospital of Chicago.

GENTLEMEN,—While the patient is being anæsthetized we shall have time for a few remarks. She is a married woman, forty-two years of age, and has been suffering ever since the birth of her youngest child, two years ago. She is a servant, but in her present condition is unable to do her work. An operation for laceration of the cervix was performed upon her a year ago, which resulted in making her feel worse. I cannot tell you how often patients have told me that they have felt worse after a trachelorrhaphy. Sometimes this is due to the fact that the everted lips of a lacerated cervix were full of diseased follicles before being turned in by the operation. Pressure of the inflamed surfaces of the cervix against each other thus adds to the patient's pain, while the concealment of the diseased parts from view increases the difficulty of treatment. In such cases it sometimes may become necessary to reopen the cervix and amputate after Schroeder's ingenious method.

In this instance, however, the contra-indication lay in the fact that there was retroversion, with adhesions both of the fundus and of the diseased ovaries; and let the sufferings of this poor woman be a warning to you never to operate under such circumstances.

Our object to-day is to separate these adhesions and replace the uterus. To do this the peritoneal cavity must, as a rule, be opened. B. S. Schulze has taught us how to do this through the rectum, but I would advise only those of you to attempt it who expect to become

gynæcologists, or, better still (both for the patient and yourselves), not until after you have become gynæcologists. Separate a hundred ovaries through the open abdomen before you attempt to separate one per rectum. I once made a vaginal opening into the bladder, and endeavored to separate an ovary from adhesions to the posterior surface of the broad ligament with one finger in the bladder and another in the rectum. After trying for quite a while I gave it up, opened the posterior vaginal fornix, and then succeeded with the greatest difficulty in separating and removing the organ. If I had persisted without opening the peritoneal cavity I should have injured the bladder and rectum and lacerated the pelvic tissues before separating the ovary, and then should have only imperfectly succeeded and have made my patient very much worse. Only a small proportion of adhesions are sufficiently within reach of the finger in the rectum to be completely separated, and a still smaller proportion of these are frail enough to be broken through by the pressure which can be brought to bear in this way. Considerable experience is necessary to enable one to judge of the amount of force that may thus be safely employed. The method consists in passing two fingers into the rectum under the adherent ovaries, pressing the fingers of the other hand over the abdominal walls down upon the diseased appendages, and then forcing the tips of the rectal fingers up between the appendages and the parts to which they are adherent,—the abdominal fingers making counter-pressure. These tissues must not be pulled asunder, but must be pressed apart by the insinuating rectal fingers. I have a few times succeeded in separating adhesions in this way, but seldom with satisfactory results. In only one case have I separated them so completely that I felt justified in doing an Alexander's operation. There is nearly always sufficient adhesion or contraction in the tissues left either to keep the uterus in retroversion or to draw the replaced fundus backward again. In a few cases a pessary will keep up the uterus thus separated, but, as a rule, only as long as it remains in the vagina. Alexander's operation is also usually a failure, because either the ligaments will not run or the resistance of the diseased tissues will subsequently stretch the shortened ligaments.

To-day we will open the peritoneal cavity, separate the adhesions, and stitch the uterus to the anterior abdominal wall over the bladder. As the patient is ready, I shall ask Dr. Gavin, the senior assistant, to commence the operation, while I take the part of first assistant, and thus have a better opportunity to talk to you.

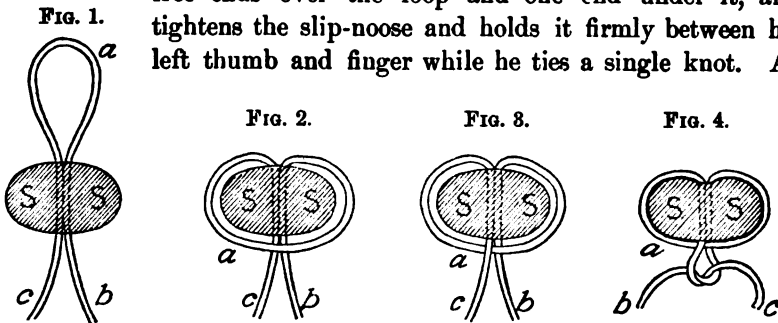
He stands on the right side of the patient, using his right hand for

the knife, scissors, forceps, and needle, and his left for intra-abdominal exploration, separation of adhesions, lifting and holding of the organs, etc. With one deliberate stroke of the knife he makes a cutaneous incision in the median line from about half-way between the umbilicus and pubes downward for about two inches. With another stroke he lays bare the superficial fascia. With sponges squeezed out of cold water I clean the wound and check the oozing. He is now nicking the fascia, and rapidly enlarges the incision upward and downward, keeping close to the median line, which is easily found by the probe or point of the fascia scissors. The edge of the rectus is separated from the median septum with the knife-handle, the posterior fascia nicked and slit upward and downward, and the subperitoneal fat exposed. This is easily separated or pressed to one side by the finger. Now, as the careful operator grasps the peritoneal membrane on his side with a pair of forceps, I grasp it similarly on my side, and we hold it well up while he nicks it. As he does so his forceps recede, and he takes a new and deeper hold, and nicks again. This time a small black hole in the membrane appears and the peritoneum rises around one forceps. Air has passed underneath the membrane, and we know that the peritoneal cavity is opened, and the first stage of the operation is completed. Now I close this small opening by holding the forceps together, and press a cold sponge upon the oozing incised tissue while the operator is soaking and warming his hands in sterilized hot water and the nurses are putting hot water into the sponge basins.

I now hold up the forceps, that the operator may enlarge the incision with scissors. This he does to a slight extent, puts in his finger, and incises the membrane thus elevated upon the protecting finger. As is usual in these low incisions, a lively little artery has been cut, which bled on both sides until I compressed it with artery forceps. It is well to look out for the bladder in making these low incisions, for it is sometimes elevated and in the way. By pressing the membrane up by the left index finger, as you have just seen done, the membranous character of the tissues is easily made apparent before cutting, and the absence of the dense and vascular vesicle well insured. Increasing thickness of the peritoneal tissues as we get near the pubes, and abundant hemorrhage, should cause one to stop and investigate.

While we have been talking, our operator has thrust two fingers so far down behind the pubes as to touch the uterus in the middle line, and is feeling back towards the retroposed fundus, and from thence first to one of the ovaries and then to the other. His delay is caused by

the attempt to separate both ovaries before lifting them up. But by persevering he has at last succeeded in bringing to light the enlarged ovary, which was still larger before this cyst ruptured. You noticed that I placed a small round sponge in the peritoneal cavity just under the incision, to remain there while the pedicle is being transfixed, to prevent infection. Meanwhile the operator is putting a slip-noose around the pedicle with the doubled end of the silk thread passing through it, and the loop is brought over the ovary and tube, so as to surround the pedicle. (See illustrations.) Now he draws one of the free ends over the loop and one end under it, and tightens the slip-noose and holds it firmly between his left thumb and finger while he ties a single knot. As



METHOD OF APPLYING LIGATURE TO OVARIAN PEDICLE.—*s*, section of pedicle; *a*, loop of silk passed through pedicle; *b* and *c*, ends of silk ligatures to be tied.

Fig. 1.—First step,—ligature passed through the pedicle.

Fig. 2.—Loop of ligature, *a*, thrown over the appendages so as to surround pedicle and lie upon the ends, *b* and *c*.

Fig. 3.—The end *c* drawn through the loop so as to lie over it, *b* remaining under it.

Fig. 4.—Loop drawn tightly around pedicle and a single twist or knot taken with ends of ligature.

his left hand holds the tied thread at the pedicle, I take hold of one of the threads, and pull against the one he has in his right hand. Having tightened it, he holds the knot with his left thumb and finger while we tie again, and the thing is done. Let me warn you never to take two turns of the thread (surgical knot) in tying the first knot, for you would be unable to draw it tight enough. The doctor has already cut off the ovary and tube about one-third of an inch from the constriction, and I will ask him while I hold up the stump with the forceps to take another turn around it with the ligature and tie it as tightly as possible with an ordinary knot. The young operator will learn the importance of this precaution after he has lost a case from hemorrhage. The ligature is cut off about one-tenth of an inch from the knot.

While the second ovary is being removed I shall explain what is to come later.

Dr. Gavin intends to anchor the uterus to the anterior abdominal walls over the pubes. This may be done in various ways. When the appendages are removed, the stumps may be stitched on either side by some delicate, unabsorbable material. When the appendages are not removed, the round ligaments about an inch from their uterine origin may be thus sutured to the same places. Just now the most popular method is to stitch the upper portion of the anterior wall of the uterus in the abdominal incision, thus making a rigid fixation. The objection to the first-mentioned methods is that the uterus is not fixed firmly enough; the objection to the last is that the uterus is too firmly fixed, or immobilized. Some writers fear that intestines may become strangulated between the fundus of a loosely suspended uterus and the abdominal walls, but surgeons have not, so far as I know, met with any such accident. I have stitched the stumps to either side of the incision in many cases, and since I have used silk for the purpose have not noticed any failures. We will use silk to-day.

Now that both ovaries are removed, I take hold of the peritoneum and fascia at the middle of the incision on the right side and left, and slightly evert the edges. Dr. Gavin, with a slender needle on a holder, passes a fine silk thread through a small section of the peritoneum, about an inch to the right of its cut edge, taking care to include a bit of the contiguous fascia, then through the stump, which we hold up by forceps, and draws the stump firmly against the peritoneum and ties it there. Another portion of peritoneum and stump is similarly included in the thread, and tied, and one stump is anchored. It takes but a moment to do the same thing on the other side, and the second part of the operation is completed. I now place a long, flat retractor down over the posterior wall of the uterus, while the operator holds the intestines away with his fingers and passes a small sponge into the recto-uterine cul-de-sac, and, as you see, gets a trace of blood. In order to be sure that too much oozing is not going on from the raw tissues at the site of the former adhesions, I pass, for temporary use, a glass drainage-tube down into the cul-de-sac. These sutures which are now being put through the entire thickness of the incised tissues are of silkworm-gut, which possesses nearly all the advantages of both silk and silver wire, and none of the disadvantages of either. Now that the sutures are in, we pass a small rubber tube down to the bottom of the drainage-tube, and draw out the fluid by means of a glass syringe already attached. Only a few drops of serum slightly tinged with blood appear, and we know that we can safely take out the tube and completely close the peritoneal cavity. Before tying the

last stitches, the small sponge which was kept over the intestines is taken out, and the omentum adjusted under the incision to prevent adhesions of the intestines to the line of incision.

The only item of the after-treatment worth mentioning is the administration of a saline laxative in divided doses as soon as the ether nausea has subsided, for the purpose of securing a movement of the bowels or an abundant passage of flatus by the end of the first twenty-four hours. If the laxative does not act properly, an enema composed of an ounce each of glycerin, sulphate of magnesia, and water is given. This action of the bowels prevents either the adhesion of a kinked intestine to the stump or an adhesion between the fundus uteri and the abdominal wall.

THE EXPLORATORY ABDOMINAL INCISION.

CLINICAL LECTURE DELIVERED AT THE MEDICO-CHIRURGICAL HOSPITAL.

BY WILLIAM EASTERLY ASHTON, M.D.,

Professor of Gynecology in the Medico-Chirurgical College of Philadelphia; Gynecologist to the Medico-Chirurgical and Philadelphia Hospitals.

GENTLEMEN,—The patient before us came from the interior of the State to the hospital on the 15th of last October. Her history was as follows. Mrs. Margaret B., forty-eight years of age. She was married twenty-four years, but has been a widow since 1887. She has had ten children and four miscarriages. The menopause occurred in August, 1892.

Three years ago, while reaching for an object upon a high shelf, she felt something suddenly snap or give way within the abdomen. Since that time she has suffered from backache, bearing-down sensations in the pelvis, and a feeling of soreness over the entire abdomen. About one year and a half ago she began to complain of more or less pain around the umbilicus. Urination was normal, and the bowels were constipated. For the past four or five years there has been a profuse yellowish leucorrhœa.

Upon examination, the uterus was found to be enlarged and retro-displaced, but not fixed. The cervix was hypertrophied and deeply torn. A careful examination of the abdomen revealed nothing abnormal. As the subjective symptoms were evidently due to the diseased condition of the uterus, the patient was etherized on the 20th of October, when the cervix was amputated and the interior of the womb curetted. The patient made a rapid recovery from these operations, with the relief of all her former symptoms. On the 3d of November, however, she began to complain of pain and slight soreness over the entire abdomen. The temperature and pulse were normal. The pain has increased in severity, but shows no tendency to become localized. A most careful examination of the pelvis and abdomen has revealed nothing except a slight soreness over the entire surface of the

belly, but not accentuated at any one point. A chemical and microscopical examination of the urine has excluded disease of the kidneys or bladder. At no time has the temperature or pulse been abnormal.

This is the eleventh day since her symptoms began, and I bring the case before you to make an exploratory incision to discover, if possible, the cause of the pain and remove it.

While the patient is being etherized, let us discuss briefly the indications for an exploratory abdominal incision.

My rule in practice is to open the abdomen for purposes of diagnosis in all obscure cases where the symptoms indicate immediate danger to life or where they point to pathological conditions that are likely in the future to cause death; and, finally, in all obscure cases for the relief of pain or of symptoms producing chronic disability.

To illustrate these points, permit me to refer briefly to a few cases coming under my personal observation. In the fall of 1891 I saw, in consultation with Dr. Thomas Curry, of this city, a patient who was dying gradually from chronic intestinal obstruction. Upon examination, the abdomen was so tympanitic that no cause for the condition could be demonstrated. An exploratory incision revealed a tumor of the ileum which almost completely occluded the lumen of the gut. A lateral anastomosis was performed, and the patient is to-day in perfect health. Another case was that of a boy, eleven years of age, whom I saw in consultation with Dr. Fries, also of this city. The child had received an abdominal injury seven days before my visit. The day following the accident symptoms of peritonitis began to develop, and the attending physician urged a consultation with an abdominal surgeon. The family, however, refused to give their consent until a week later, when I was sent for. An exploratory incision revealed intussusception in the small bowel, extensive sloughing, and a general purulent peritonitis. Death occurred a few hours later. In neither of these cases was a diagnosis made prior to abdominal section. Both patients were operated upon solely on account of the symptoms which indicated danger to life. Had an exploratory incision been performed in the case of intussusception when the attending physician first urged it, the boy would in all probability have recovered. I wish to emphasize this fact, because it so often happens that the surgeon is called in at a time when the patient is beyond the resources of surgery. This is especially true in cases of abdominal injury, acute intestinal obstruction, ectopic gestation, appendicitis, and other like conditions.

Among those cases where the symptoms point to pathologic condi-

tions that are likely in the future to cause death, and consequently call for an exploratory incision, the most important is malignant disease of the stomach. Unfortunately, the surgeon is not consulted in the majority of instances until the patient is so exhausted by the disease that even the temporary relief afforded by a gastro-enterostomy is contra-indicated. If an early exploratory incision is made in these cases, even if a radical cure cannot be promised, we can at least prolong life and save the patient from the symptoms of pyloric obstruction. I would not have you infer that I advise opening the abdomen upon the slightest suspicion of malignant disease, or without a most careful consideration of the case, but I do most emphatically believe that we should not wait for the presence of a tumor and other unmistakable signs before considering the question of an exploratory incision in certain chronic diseases of the stomach.

I saw, in consultation with Dr. Strittmatter, of this city, a case which illustrates in a striking manner the intense suffering caused by delay in resorting to surgery. The patient was a man about fifty years of age. He had been bedridden for several months, and was emaciated to the last degree, and suffering intensely from all the symptoms dependent upon pyloric stenosis. The man's condition did not warrant an operation, and he died a few days later. Had Dr. Strittmatter, however, seen this patient early in the course of the disease, an operation would have saved months of needless suffering.

Again, an early exploratory incision will enable the surgeon to make a positive diagnosis in the non-malignant varieties of pyloric stricture, and not only to cure the condition, but also to save the patient from painful and exhausting symptoms or even from death; the same is also true in certain cases of gastric ulcer.

Finally, the abdomen should be opened in all obscure surgical diseases involving its contents, to enable a positive diagnosis to be made, and to obtain, if possible, radical relief. To impress upon you the necessity for abdominal exploration under these circumstances, I shall refer to a case sent to me by Dr. D. H. Oliver, of Bridgeton, New Jersey. The patient was a man twenty-five years of age. He had during 1893 three attacks of appendicitis. At the time he consulted me he had entirely recovered from the last attack, and was attending to his duties as a railroad conductor. There was apparently nothing immediately dangerous in his condition, yet the history of three recent attacks of appendicitis settled in my mind the absolute necessity for an exploratory incision. To this the patient consented. Upon opening the abdomen the appendix was found behind the colon, buried

beneath firm and dense adhesions which required the free use of the knife to separate them. The base of the appendix had sloughed, and surrounding it was a small abscess-cavity containing about fifteen drops of pus. The patient made an uninterrupted recovery.

This case is most instructive, as it illustrates forcibly what I have been teaching for the past two years,—namely, that as it is impossible in cases of appendicitis to know the pathological conditions present at the seat of trouble, there is no treatment for the disease so reliable as the knife.

In those cases where an exploratory incision is indicated for pain or disability to carry on the duties of life, the symptoms have been present for a long period of time, without, however, there being any immediate or apparently remote danger to life. The diagnosis in these cases is not only obscure, but in many instances impossible. In this group of cases we include various chronic pelvic troubles, intestinal adhesions, non-malignant abdominal growths, etc.

I could readily cite many instances that I have seen, not only in my own practice, but also in the hands of other surgeons, in which no idea of the true condition could possibly be formed prior to an exploratory incision, and yet in a number of these cases not only was a positive diagnosis made upon opening the abdomen, but, more important still, radical relief was obtained. I shall not have time, however, to enter more fully upon this subject, as the patient is now fully under the influence of the anæsthetic.

You will notice that I have made the incision through the belly wall in the median line. This should always be its situation, except when the symptoms are localized or refer to certain regions or organs within the abdomen. For example, if the symptoms indicate that the seat of trouble is in the stomach, the liver, the appendix, or one of the other organs, the incision must be made directly over its normal position within the peritoneal cavity. As the symptoms in the patient before us are not localized, the median incision is selected as being the best from which to explore all of the abdominal contents. I have now examined the pelvis, but fail to find anything abnormal. Enlarging the incision towards the umbilicus, and introducing my entire hand within the abdomen, I examine the small intestines, the large abdominal blood-vessels, and the kidneys. Continuing the investigation higher, I have ascertained the condition of the viscera in the upper segment of the peritoneal cavity. Thus far nothing has been found abnormal; the organs are apparently healthy and free from adhesions or new growths.

We shall now examine carefully the right iliac fossa. The cæcum evidently in this case is entirely covered by peritoneum, the mesocolon, as there is more latitude of movement than is generally present. Making gentle traction and endeavoring to bring the colon into view, I find that after reaching a certain point it becomes fixed. This means either that its limit of movement has been reached or that an adhesion prevents the bowel from being brought nearer to the median line. Keeping up gentle traction upon the head of the colon, I pass my finger around the bowel and find that the appendix is taut and its tip adherent to the side of the pelvis. This condition at once explains not only the fixation of the bowel, but also, I take it, the cause of the symptoms from which this patient has suffered, as these adhesions mean a pre-existing inflammation. The tip of the appendix has now been freed, and at once the cæcum comes into view. The appendix is somewhat thicker than normal, but not markedly so, and at its tip you can see distinctly the little fringe-like projections which are the adhesions that have been separated.

The slight thickening of the appendix, and especially the fact that it was adherent, settle in my mind the necessity for its removal. As the appendix is not attached by a fold of peritoneum, we at once place a silk ligature around the base and remove it. The mucous membrane is now curetted away from the stump, which is invaginated into the colon and held in position with silk sutures. As irrigation is not indicated, nothing remains to be done but to close the abdomen and apply the usual dressings over the wound.

I shall now make an incision into the appendix and expose its interior surface. Those of you who are near will notice the fin of a fish occupying the extremity of its canal. The mucous membrane is inflamed, and you will also observe the evidences of traumatism caused by the fin as it worked its way downward.

We have, then, in this specimen a full explanation of the symptoms in this case. It is one of those rare instances of appendicitis in which the symptoms failed to indicate the grave pathologic conditions present or to show a tendency to become localized. This is the second case of its kind of which I have a personal knowledge. The first case occurred in the practice of Professor Keen, of this city. He performed an exploratory operation upon a woman for severe abdominal pains which were not localized. The symptoms were so obscure that a diagnosis was impossible. Dr. Keen found upon section that the patient was suffering with appendicitis, and he removed the appendix. The macroscopic examination showed a catarrhal inflammation and a stricture in

the middle of the appendix ; there was no foreign body. The patient made a good recovery, with entire relief from all her former symptoms.

The happy result of the operation which has been performed before you this morning will impress upon your mind the urgent necessity for appreciating the position which the exploratory incision holds in surgical practice. We have in this method of diagnosis a means which is not only perfectly safe, but also accurate in many instances. Although I do not hesitate to say that an exploratory incision is without danger to life, yet you must thoroughly understand that it is frequently fatal unless performed by a surgeon whose aseptic technique is beyond criticism. Dirt introduced within the peritoneal cavity will be followed by a septic infection just as certainly as micro-organisms will develop in a culture medium in the laboratory. Again, the post-operative environment of a patient upon whom an exploratory incision has been performed can in no way cause the development of sepsis, and if this condition supervenes, the infection occurred at the time of operation. Sepsis cannot occur from external causes after the abdomen has been completely closed. Take, for example, if you please, the culture medium contained in a glass tube whose open end is closed tightly with a plug of cotton. After sterilization, it makes no difference where the tube is placed, or where it is kept, or what may be its surroundings, the culture medium remains sterile so long as the cotton plug is not disturbed. This is precisely the condition after an abdominal operation not septic at the time or followed by drainage. No germs from without can enter an abdomen tightly closed, any more than they can infect the culture medium protected by the cotton plug. Therefore the surgeon who has a septic infection following an abdominal operation under these circumstances must look to the operative technique, and not lay the blame for want of success upon the subsequent environment of his patient. I have referred to this subject, as it is important for you to know and appreciate the causes of death following an exploratory abdominal incision.

[The patient made a prompt recovery.]

The following is a report from the Kyle-Da Costa laboratory of an examination made of the appendix.

The Macroscopic Examination.—The appendix had been opened by a longitudinal incision which extended above and below the inflamed area and exposed the fin of a fish. The tissues surrounding the base of the fin are highly inflamed. The irritation caused by the foreign body in its passage down the appendix is marked by a well-defined line of inflammation.

The Microscopic Examination.—The examination of sections made from the inflamed area shows that the pressure and irritation of the foreign body had caused capillary thrombosis or a blocking up of the circulation which was almost complete. The obstruction to the circulation is further increased by transudate, and possibly by a proliferation of exuded corpuscles. The hemorrhagic area showed disintegration of the mucous epithelial cells, some having undergone fatty degeneration. If this process had continued, an abscess would have resulted, owing to the evident infection of the parts.

OVARIAN NEOPLASMS.

CLINICAL LECTURE DELIVERED AT THE LONG ISLAND COLLEGE HOSPITAL.

BY ALEXANDER J. C. SKENE, M.D.,

Professor of Gynæcology, Long Island College Hospital, and Dean of the Faculty.

GENTLEMEN,—Diseases of the ovary of the degenerative order will occupy our attention this morning. First of all, we shall consider ovarian tumors or ovarian neoplasms. There is a great variety of these neoplasms. I simplify the classification, so that you can easily remember it, as follows: tumors that can be controlled and the lives of the sufferers saved by surgical means, and those that are not so amenable to treatment and in which the tendency is towards the destruction of the individual. You will see at a glance that the latter class includes all the malignant diseases of the ovaries, fortunately the most rare. The most common are the simple cysts or cystomata, neoplasms made up of a single cyst or a number of cysts, usually the latter. First let us inquire as to where they take their origin in the ovary, because we shall find that according to their location in the ovary will be their character or anatomy to a certain extent.

The ovary is divided into a mature glandular portion, where are found the matured Graafian follicles, and a deeper portion, where we find the immature or rudimentary ones. In the glandular structure the ordinary ovarian cysts are developed; in the deeper structure we find another variety of cysts, differing somewhat from the ordinary cysts in their character. They are all cystic neoplasms, but they differ to some extent in their anatomical characteristics.

Let me also call your attention to another variety of cysts; they are formed in the neighborhood of the ovaries and are often confounded with them. They are the parovarian cysts, which originate in the parovarium,—a number of convoluted tubules or ducts above the ovary, the remnant of a foetal organ; they seem to serve no purpose, and we never hear of them except when occasionally a cyst is formed in one of the ducts. These cysts grow in the same way as ovarian cysts. In

the books they are sometimes called cysts of the broad ligament. Occasionally a cyst that is developed in the ovary becomes an intra-ligamentous cyst, and so has been confounded with a parovarian cyst, and there is apt to be more or less confusion in the minds of students and even of physicians with regard to these cysts. There is no broad ligament cyst, properly speaking, and I should like to have that term blotted out of our books. It is either a parovarian cyst or an ovarian cyst that has found its way into the broad ligament. There is no such thing as a cyst that takes its origin in the broad ligament, as a rule at least.

Ovarian cystomata are usually multiple, or multilocular, but they may be unilocular. When one cyst so far outstrips the others that it monopolizes them, we call that, clinically speaking, a monocyst; whereas if a number of cysts make up the cystoma, we call that a multilocular or multiple cyst. They consist of a cyst wall and the cyst contents. When a cyst is developed in the deeper structures of the ovary, it is nearly always complicated by a growth from its inner wall, and this is known as a proliferous cyst. Occasionally we find developed in the deeper structures of the ovary another form of cyst, known as the dermoid cyst, the contents of which differ very materially from the contents of the other forms, as it contains hair, bone, teeth, and sometimes fatty material; in fact, the fluid contained in a dermoid cyst is often composed of fat in a fluid state. The parovarian cyst is always single, with no other little cysts around it; it always contains fluid, which is pure serum or water; the inside and outside of it are perfectly smooth. The simple cyst consists of a cyst wall and a pedicle which attaches it to its source or point of origin. A true ovarian cyst, as it grows, carries with it the peritoneum and the Fallopian tube; the utero-ovarian ligament is included in the pedicle, also the vessels, both veins and arteries; these often become very markedly enlarged.

These tumors of the ovaries grow slowly and persistently, and we find three clinical stages of their growth: first, when they are yet small and occupy the pelvis; second, when they become so large that the pelvis can no longer contain them, and they rise up into the abdominal cavity; third, when they become so enormously large as to interfere, by reason of pressure, with the functions of the abdominal and thoracic organs and the general nutrition. Between the second and the third stages it is a matter of degree; between the first and the second it is a matter of location. At first such a tumor may give rise to no great inconvenience. As the growth increases it presses upon the abdominal organs, interferes with the quantity of food taken, with di-

gestion, and with respiration by crowding upon the diaphragm, and thus the general nutrition begins to suffer. The tendency of these tumors is towards the destruction of the individual. They keep on growing until the individual is crowded out of existence. Besides this, there are often complications which are of vast importance to the surgeon. The first and most important complication of all is circumscribed peritonitis. The frequency with which this occurs and the extent of the inflammation depend considerably upon the nature of the tumor. A simple cyst, if no accident happens, rarely excites very much inflammation. The proliferous cyst seems more inclined to do that, probably because it is more vascular and can more easily set up an inflammation. The dermoid cyst—fortunately a rare one—almost always sets up an inflammation. These inflammations lead to adhesions, and the extent of such adhesions depends upon where the peritonitis takes place. If it take place in the first stage of the tumor, the cyst will become adherent to the pelvic organs, and will not be able to rise into the abdomen. If, however, no inflammation take place until the tumor rises into the abdomen, the adhesions to the abdominal walls, intestines, and omentum will occur. Sometimes the lower portion may adhere to the broad ligament.

If inflammation does not take place until the third stage, the adhesions may be to the diaphragm, the liver, or the upper part of the abdominal walls. The degree and extent of the adhesions will depend, naturally, upon the duration of the tumor. Nowadays we seldom see adhesions so high up. The laparotomists are so alert that they hardly ever allow a patient to go on to that stage. Now, why this inflammation? The nature of the tumor itself favors adhesions. The more complicated the pathological anatomy of the tumor the more certain are you to have adhesions. We may also have a rupture of one of these cysts, and its contents, poured into the abdominal cavity, will set up a peritonitis. This may occur in any stage, but it is most likely to occur in the second or the third stage. Then the peritonitis is very likely to prove fatal unless the surgeon is quickly on hand. If the patient is in a state of collapse, the surgeon may not dare to operate. Sometimes the rupture, if a small one, will close and the tumor will grow again, and then if you endeavor to remove it you will find it much more difficult or even impossible to do so. I have seen it impossible to remove such a tumor at a post-mortem. Then, again, the cyst may open, not by direct rupture, but by ulceration and perforation. A little degeneration takes place at a given point; the contents seem to get ahead of the development of the sac, which is very tense, and

perforation takes place ; then there is a discharge of the ovarian fluid, and that may set up a general peritonitis. Again, if the sac is not so tense, and the cyst wall is ample, and the leaking not so marked, but enough to set up a conservative peritonitis which closes the opening, all you will find there will be a rather firm adhesion.

There is another curious complication which sometimes takes place, where the tumor rotates or revolves. Usually an oblong or irregularly-shaped tumor will turn around and twist the pedicle. If this is repeated it cuts off the blood-supply, and then there is acute starvation of the cyst. The return of the blood from the cyst is also interrupted, and there will be an extraordinary engorgement of the sac, and in general more pressure and pain and constitutional symptoms. If there be starvation and death of the tumor, there will be present the general and local symptoms due to this mass suddenly dying. When the pedicle becomes twisted, it requires immediate interference, as it may prove fatal in a very short time. This dead mass will excite inflammation, and if the patient is not relieved by the surgeon, septicæmia will result. There is yet another complication, less severe and less alarming, and that is partial necrosis of the sac,—death of the cyst wall. That comes about where the cyst wall is tolerably thick and where the circulation is not well developed. It is likely to occur in patients who have a feeble constitution,—in stout old women. One-half or one-third of the cyst wall dies. It may be due to a degeneration of the blood-vessels which supply these parts. It shows itself by producing a certain degree of malnutrition, as if this dead mass caused a slight septicæmia. It rarely excites acute inflammation. The constitutional symptoms are generally the first to be noticed : the patients lose flesh and have general malnutrition, and you can find no local pain nor inflammation to account for it.

There is another condition which I wish to speak about, and that is utero-gestation. Pregnancy occasionally occurs in the presence of an ovarian cyst, and it is a serious complication ; serious because if gestation goes on the tumor will grow more rapidly. This will cause a distention of the abdomen from the gestation and from this tumor also, which will give rise to unusual pressure and inflammation. So when you find a case of gestation accompanying a tumor of the ovary, you may expect all complications to take place. We take a hint from this, and either remove the tumor before the period of gestation has advanced very far, so as to allow gestation to go on, or, as others recommend, interrupt gestation at an early stage. But here comes in a moral question which I have no right to settle for you : you must settle that for

yourselves and for your patients. I may say here, however, that the early removal of the ovarian cysts gives about as good results as emptying the uterus, and by that method we are free from all question of doing wrong.

There are many other conditions complicating ovarian cysts, but I shall omit them, as they are less important. The causes of these ovarian cysts are very obscure. We know very little about them. We have speculated and investigated for a long time, and the conclusions we have come to are not very satisfactory. And yet it is a question that we are being asked all the time. To save my own time, I always say I do not know. One holds the idea that it is simply a dropsical condition on account of disease of one or more of the Graafian follicles,—that the wall of the follicle goes on growing and cyst fluid forms. Another tells us that in the deeper structure of the ovary, where we meet with the proliferous form of the cysts, there is a degeneration of the blood-vessels, which forms a cyst.

Respecting the cause of dermoid cysts, much speculation has been indulged in. We know to-day that they occur in the deeper portion of the ovary, and we believe that the germ of these cysts exists from the beginning, from the development of the ovary; that they remain latent until adult life. Another theory is that during the development of a single embryo, there was material enough for two; that the original design was to have twins, but by some means one got ahead, and the other one got caught in the ovary and remained quiescent until the adult age of the first, and then formed a dermoid cyst.

Much time and study have been spent in trying to discover the causes which produce the several varieties of ovarian cysts, but there is very little definite knowledge on the subject; if we knew their causation, we might, by some means or other, prevent their coming; but until then we are unable to battle with them successfully.

RUPTURED TUBAL PREGNANCY.

CLINICAL LECTURE DELIVERED AT THE BUFFALO GENERAL HOSPITAL.

BY MATTHEW D. MANN, A.M., M.D.,

Professor of Obstetrics and Gynecology, University of Buffalo; Attending Gynecologist to the Buffalo General Hospital.

GENTLEMEN,—This patient came to the college dispensary, whence she was referred to the hospital that I might see her and give an opinion regarding her case, which is somewhat unusual and interesting. She is thirty-two years of age, and has been married fourteen years, having had three children; the last nine years ago. Her general health has been good, her menstruation regular and painless, and not too copious. A week ago last Friday, about the time when she expected to be unwell, she had bearing-down pains in the back, and extreme pain in the bowels, which was relieved by the external application of heat and the internal use of some alcoholic stimulant. The pain lasted, however, a whole week,—not continuously, but intermittently, like labor pains. After two days the menstrual flow began, the pain remaining unchanged. She was not relieved till she went to the dispensary, where she was given phenacetin, and the flow did not cease till yesterday (Sunday), nine days from the beginning of the trouble.

Now, from the clinical history of the case we have not been able to make a diagnosis with any certainty, but fortunately my assistant was able to examine her when she came to the dispensary last Friday, a week after the beginning of the trouble, and at that time he found something more than can be found to-day. Behind the uterus, and especially on the right side, there was more or less enlargement,—a mass of some kind, rather firm and exceedingly tender, so tender that it was difficult to make a careful palpation of it. She was still suffering from the bearing-down pains. The doctor was in doubt as to the diagnosis, though he surmised what it might be, gave her appropriate medicinal treatment, and asked her to come here. She is now very much better, and the pelvic mass which the doctor felt the other day has very greatly

diminished, so much so that if I had not had my attention called to it I should hardly have found it. There is still, however, a little thickening behind and to the right of the uterus, and as I press directly backward there is some tenderness. At the time the patient was at the dispensary neither elevation of temperature nor acceleration of pulse were found.

From the history, perhaps the first thing of which we should think would be extra-uterine pregnancy, with a ruptured tube. It might also be an inflammatory condition in the tubes, with a certain amount of pelvic peritonitis, or some growth which had existed there; for example, a small dermoid cyst of long duration, which had given no previous trouble and had suddenly become irritated and had caused this pain. Or the case might simply have been one of dysmenorrhœa, with the inflamed condition of an old dermoid cyst or some other tumor. Some of these diagnoses are thrown out at once by the examination to-day. If there had been a dermoid or ovarian cyst or other tumor, it would remain to-day, and we can safely exclude these suggestions. With regard to the diagnosis of inflammatory trouble, there was no rise of temperature, and the woman had been previously in good health, with no reason for inflammation in the pelvis. Although the result of the digital examination would correspond with inflammation and the formation of an exudate, the lack of febrile symptoms does not correspond, nor should we expect an inflammatory mass to have disappeared so rapidly. The case might also have been an abortion at one month, and the expulsive pains would lend credence to this view; but there would not have been the mass behind the uterus unless there had been retained secundines and septicæmia with septic salpingitis and peritonitis, and these conditions would not have passed away in three days; so I think we can throw out that idea also. There might have been an abortion and possibly a hæmatocele, a certain amount of blood escaping from the tube without any tubal pregnancy, but we have no proof that such a condition can exist, and tubal pregnancy is much more likely to be the true diagnosis than the regurgitation of blood from the tube and a consequent hæmatocele. I think, therefore, that we are brought down to the diagnosis of ruptured tubal pregnancy. As I have told you in the didactic lectures, I believe tubal pregnancy is very much more common than has ordinarily been supposed. I have no doubt that there was blood in the peritoneal cavity, and that the extreme tenderness was due to irritation of the peritoneum and slight peritonitis, but not of a septic type. In the mean time almost all the blood has been absorbed and there is left only a little

thickening, which can be explained as being a little remaining blood, and a certain amount of exudation into the peritoneum, which exudation will be absorbed much more slowly than the blood itself. The amount of hemorrhage was very slight.

These cases of ruptured tubal pregnancy almost always have a bloody discharge from the vagina soon after rupture,—within a few hours or sometimes after a day or two,—and they flow almost continuously. The books do not state this, but describe gushes of blood and stoppages, which I do not find to be the case in my experience. I have seen patients who have flowed six weeks, dating from the time of rupture. In such a case as this there is nothing to do; nature has taken charge of the affair; the hemorrhage has ceased and the blood has been almost entirely absorbed. The patient will doubtless entirely recover, and the tube may even regain its normal condition, as the rupture at so early a time in pregnancy is slight, and perhaps in a year from this time, if we had an opportunity to examine the pelvic organs, we might find nothing more than a little scar showing the place of rupture.

Only the other day I saw an undoubted case of ruptured tubal pregnancy. The patient was operated upon by another operator, and, unfortunately, died, but the diagnosis was confirmed. I have seen twenty cases of tubal pregnancy in the last eighteen months. Half of these have been subjected to operation and the diagnosis confirmed; the others were either treated by electricity and cured, or their condition was not such at the time that I saw them as to demand any treatment whatever.

UMBILICAL HERNIA, EARLY MENOPAUSE; LACERATED CERVIX AND VAGINAL ENTEROCELE; RECTOCELE, LACERATED CERVIX, AND RETROVERSION.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POLYCLINIC.

BY PAUL F. MUNDÉ, M.D.,

Professor of Gynecology in the New York Polyclinic.

UMBILICAL HERNIA; EARLY MENOPAUSE.

GENTLEMEN,—This patient is forty-one years old. She has been married about eight years, and has had three miscarriages, the last at the third month, one year ago. She complains of pain in the lower part of the back and in the ovarian regions, and of hot flashes through different parts of the body, followed by profuse perspiration. You notice the woman has a large abdomen, which is very tense and which closely simulates an abdominal tumor. On percussion it is found to be resonant throughout, and on lifting up the abdominal wall with the hand we find she has a great deal of adipose tissue. Besides this, on allowing her to lie quietly for a moment with her mouth open, the parts are relaxed and the abdomen is gradually reduced in size, thus showing that there is no abdominal tumor, but that the distention is due to fat, flatulence, and muscular resistance. This, then, is a false tumor. In addition to this you notice a protrusion at the umbilicus, which is increased on coughing, and on gently inserting the finger into the centre of this protrusion we find it can be replaced, and that the finger encounters a sharp, tense ring about half an inch in diameter. This is the umbilical ring, and the protrusion is an umbilical hernia. As there is considerable discomfort and pain on pressure, we shall advise her to get an abdominal supporter with a hard rubber or wooden pad, which will gently press down the protruding intestine and close the ring. Such bandages, however, are very apt to slip, and if the pressure be great the pain will be more severe than the condition which they are expected to relieve. I have seen the intestines

forced out through an opening even smaller than this until the protrusion was as large as an egg, and the part becoming incarcerated, it was necessary to give an anæsthetic and freeze the tissues before the protrusion could be returned. If this had not been successful, an incision would have had to be made down to the ring and the latter slit upward and downward, to allow of the reduction of the hernia. It would be desirable, then, to freshen the edges of the ring and unite them by deep sutures passed through the peritoneum and the whole of the abdominal wall. Sometimes these umbilical hernias are very large. The largest abdominal hernias we find are not umbilical hernias proper, but are really ventral hernias, from the separation of the recti muscles as a result of numerous confinements, or after a laparotomy. The scar from such a wound often weakens the abdominal wall, allowing the formation of such a hernia. In operating upon one such case I removed an intra-ligamentous ovarian tumor. She had had two previous laparotomies done. I freshened the parts on either side and brought them together by deep sutures after removing the ligamentous cyst.

This woman, who is forty-one years of age, has not menstruated for nine months, and complains of hot flashes or waves followed by profuse perspiration. This is one symptom of the condition which I presume is already here established,—viz., “the change of life.” You might look for pregnancy at her age, but menstruation has already ceased for a time equal to the normal period of gestation, and an examination negatives this theory. The uterus is, however, enlarged, hard, and slightly ante-flexed. The enlargement of the uterus is due in all probability to a fibroid in the anterior wall and towards the left side. One would expect, under such circumstances, that the patient, instead of being amenorrhœic, would be menorrhagic; but subperitoneal fibroids do not, as a rule, have any such effect upon menstruation. Almost all women who are passing through the period known as “the change of life” suffer more or less from hot flashes and perspiration, and also from a great variety of other neurotic symptoms, which disappear when the menopause is fully established. The cervix is so far behind in this case, and the patient so nervous, that I shall make no further attempt to introduce the sound. Usually in cases of uterine fibroids the menopause is postponed, yet in this patient the menopause seems to be rather earlier than common. I am unable to explain her reaching the menopause so early. I have two patients (sisters), one about forty and the other forty-four years of age, who have told me that they have at times skipped long periods—at one time six years and at another nine years—without being unwell at all, and then menstruation has returned

naturally. The sister who is forty-four years of age conceived about one year ago, and was four months pregnant when she came under my care on account of diabetes. Some years before she had had a dead child, and had nearly lost her own life from the debility consequent upon the confinement complicated with the diabetes. She came to get my advice as to the advisability of allowing pregnancy to go on to term. There is very little literature upon this subject, but I found in Lusk's book a brief *résumé* of the statistics of the subject, showing that about fifty per cent. of the diabetic women who went to term died. The family physician not agreeing with me about advising abortion, the case was referred to Dr. T. G. Thomas, who also advised abortion, and this I produced. She is now in good health. The case is interesting as showing that a person may, under certain circumstances, go for nine years without menstruating and yet afterwards conceive. An early menopause is sometimes due to excessive involution of the uterus and ovaries following confinement. I have seen it occur as early as the twenty-sixth year. I have been told by one of my patients that she ceased menstruating at the age of twenty-five, after a difficult confinement. Both uterus and ovaries might atrophy as a result of pelvic peritonitis and a consequent shrinking of the peritoneal adhesions, and of course such a condition is not amenable to treatment; but so long as there is a menstrual molimen, even without any flow, the local use of electricity, intra-uterine applications of carbolic acid, hot douches, and measures directed towards building up the general health may prove successful.

LACERATED CERVIX AND VAGINAL ENTEROCELE.

The next patient is twenty-six years of age. She has been married three years, and has had two children and one miscarriage. The last delivery was six months ago. She flows every four weeks for six days, the last time being two weeks ago. She complains of pain in her back and on the left side of the abdomen, and of profuse white vaginal discharge. After the birth of her first child she says she had "blood-poisoning," and was sick in bed for some time.

This is a case in which the finger detects a rather peculiar condition. The uterus is in the first degree of prolapsus, the cervix being two inches within the vulva, and, as is usual in such cases, it is also retroverted in the first degree, the axes of the uterus and the vagina being about in the same plane. The external os gapes so as to allow the passage of the finger one-half inch into the canal; the cervix has evidently been torn, but this laceration has been intra-cervical, and

the tear has not extended into the mucous membrane of the vagina. This laceration has been the cause of the subinvolution. The only cure for such a tear is to make it a complete laceration by cutting the rent in the cervix down to the vaginal wall, paring the edges, and sewing it up in the usual way. There is a coil in Douglas's cul-de-sac which feels like a loop of small intestine, into which you can introduce your finger and push it from side to side. On the left side you can feel the ovary and tube. I think, therefore, this is an empty loop of small intestine which has dropped down into Douglas's pouch. This is an unusual condition, for ordinarily this pouch is empty. In the normal position the uterus is slightly antecurved, the anterior wall of the rectum lying against the posterior wall of the uterus, and the superincumbent intestines keeping the uterus well anteverted, so that there is not room for a loop of the small intestine to slip down into Douglas's pouch. Formerly it was not known that anything ever occupied this pouch, but laparotomists have shown that it is not always empty. I am unable to explain the condition here, unless it be that the uterus has changed its position and has sunk down into the pelvis so as to remove the fundus from the anterior surface of the rectum. This cord-like body might be a Fallopian tube, but it is not very tender, and if a tube had reached this size it would be decidedly tender. Ordinarily the contents of this pouch are not of much importance; but if it became necessary to operate, as, for instance, for supposed abscess in Douglas's cul-de-sac, the possibility of a coil of small intestine getting down into this pouch would be a matter of some importance. It also assists us in understanding how a vaginal hernia may take place,—the so-called enterocele. A number of cases are on record where, during confinement, an obstacle to delivery has been found in the shape of an elastic tumor at the vulva, which at first was naturally supposed to be an ovarian cyst. An examination, however, would show that it was resonant all over on percussion, and hence the proper treatment would not be tapping, but would consist in putting the woman in the knee-chest position and trying to push up the presenting part and the prolapsed intestine. The obstacle might become so great as to necessitate the performance of craniotomy, in order to avoid dangerously long pressure upon the bowel.

MENOPAUSE.

Our next patient is forty-seven years old. She has been married thirty years, and has had four children and two miscarriages, the last twenty-two years ago. Her last menstruation was four months ago.

This case is similar to the one first presented to you to-day. She comes to us complaining of headache, hot flashes, and sweatings. She is suffering from the symptoms of the climacteric, and I mention the case only to associate it with the other one which has already been brought before you. The fact that this woman has pretty well passed the menopause is shown by the introduction of the sound, which indicates that the uterus, instead of being two and one-half inches long, is only two inches in depth. The shortness of the cervix at once indicated to me that the uterus was beginning to undergo the natural atrophy of the climacteric. The treatment of such patients consists in the use of valerian, asafoetida, and similar drugs, in regulating the functions of the body, and in explaining away their fears as to the gravity of their symptoms.

RECTOCELE, LACERATED CERVIX, AND RETROVERSION.

I next present to you this woman, who is thirty-nine years old. She has been married seven years, and has had two children and two miscarriages. The last was a miscarriage at the tenth week, and occurred eleven months ago, since which time she has complained of pain in the back and right side of the abdomen, and of headache. She menstruates every four weeks for two or three days, the last time being one week ago. There is a bloody vaginal discharge.

On separating the labia, you notice in this case a protrusion of the mucous membrane, which, on introducing the finger, is seen to be the posterior vaginal wall. This is a pretty well marked case of what is known as rectocele, a term which implies that the rectum comes down with the vagina. This is not always the case, hence a better name is colpocele, or posterior colpocele, just as a prolapse of the anterior vaginal wall is better termed an anterior colpocele rather than a cystocele. The protrusion is the result of the laceration of the perineum, which, as you see, has extended about half-way down to the sphincter, and is also due to the redundancy of the posterior vaginal wall. When the posterior vaginal wall comes down to a greater degree, the part is exposed unnaturally, and under such circumstances it gives rise to considerable discomfort. In old and aggravated cases the only satisfactory method of treatment consists in a surgical operation, and this is best done by removing a triangular piece of mucous membrane from the posterior wall of the vagina, so as to include a larger portion of the rectocele, and then with a running catgut suture sew from the upper angle down to the perineum. This gradually narrows the

vagina, and it is still further narrowed by introducing several deep sutures through the perineum.

In addition to the rectocele, we find three other conditions dependent upon much the same causes,—viz., a pretty deep laceration of the cervix on both sides, with the papillæ and glands of the cervix considerably enlarged, a somewhat enlarged uterus, and a retroversion. The dragging down of the posterior vaginal wall has probably given rise to this retroversion. The lacerations of the cervix and of the perineum are the two primary factors in this case. The former has kept the uterus large and has led to the retroversion; the latter has given rise to subinvolution of the posterior vaginal wall and to the formation of the rectocele, and the rectocele, in its turn, has helped to drag the uterus still farther down; hence you see that these different lesions are more or less interdependent. To cure this case, the uterus must first be replaced manually and kept in position by a properly fitting Hodge pessary. After one or two menstrual periods have been passed with the uterus in its restored position, hot douches being constantly used during this interval, the lacerated cervix should be repaired and a pessary kept in place during convalescence from this operation. If, however, the cervix and perineum are operated upon at the same time, the pessary cannot be used until these wounds are entirely healed. The wire sutures are then removed from the cervix, and about one week later a pessary may be inserted, which it will probably be necessary to wear for a number of months.

Ophthalmology.

AFFECTIONS OF THE LACHRYMAL GLAND.

CLINICAL LECTURE DELIVERED AT THE SHEFFIELD GENERAL INFIRMARY.

BY SIMEON SNELL, F.R.C.S. Ed.,

Ophthalmic Surgeon to the Sheffield General Infirmary ; Lecturer on Diseases of the
Eye at the Sheffield School of Medicine ; Consulting Ophthalmic
Surgeon to the Rotherham Hospital.

GENTLEMEN,—Some cases which have recently been here under treatment afford me an opportunity of bringing to your notice certain affections of the lachrymal gland.

Diseases of the tear-passages are perhaps among the most common that you will see in this or any other eye clinic. Affections of the gland itself are, on the other hand, by no means frequent. If you consult any text-book you will find that diseases of the gland are usually referred to as being extremely rare. Mr. Swanzy, in his excellent hand-book, after mentioning that inflammation of the lachrymal gland may be either acute or chronic, and that it is extremely rare in either form, says, "I have seen one case of acute purulent dacryoadenitis, but no instance of the chronic form." Mr. Henry Power, at a meeting a little time since of the Ophthalmological Society, remarked that Sir William Lawrence had stated that in forty thousand cases of ophthalmic disease that had fallen under his observation at Moorfields he had not observed a single instance of disease of the lachrymal gland.

My experience has been different from that of Lawrence, and, as will appear in the course of this lecture, a fairly large number of instances in which the lachrymal gland was implicated have come under my notice. Affections of the gland may be justly placed among the rarer ophthalmic disorders that are met with, but the instances brought before the Ophthalmological Society during recent years testify to their not being so extremely infrequent as some would lead us to think.

A girl (M. J.), aged twenty, has recently been under your notice. She does, in fact, come to us occasionally even now. She has been the subject of acute inflammation of the lachrymal gland going on to

suppuration. On September 24 last (1893) she began to have pain in the left eye. It commenced very suddenly, and between the evening of this day and the next morning the eye had become red and the eyelids swollen. She was seen shortly after this by Dr. T. H. Morton, who has kindly supplied me with his notes as to her condition at this time. On September 30, he tells me, there was a good deal of chemosis. On this day he took these two photographs of her, which give an excellent idea of the state of things then present. You will observe that there is a good deal of swelling of the conjunctiva round the cornea, but that this is particularly marked above, and with the eyelids separated, as they are in the print, the conjunctiva is seen to be pressed down and protruding rather under the upper eyelid at the outer canthus. The photographs afford evidence also that at this period there was marked swelling over the eyelid at its outer portion. Dr. Morton also tells me that an ulcer developed at the upper part of the cornea. She first came to us on October 16. At this time the ulcer on the cornea at the upper and outer part, as far as it could be seen, was showing some signs of healing, and the chemosis below was a good deal abated, but she was still suffering a considerable amount of pain. The upper eyelid was immovable, greatly swollen, and with the surface reddened. Fluctuation was at once detected. To those of you who were then present I pointed out my reasons for not thinking this an ordinary abscess of the lid. No very definite edge of gland could be made out, but it was clearly deeper than the palpebral tissues. There was no history of injury, and, on the other hand, the account which was obtained from the patient, and which will be presently given, strengthened the opinion expressed. She was admitted into the wards, and the next day an incision was made just below the orbital ridge at its outer part, and a considerable quantity of pus was evacuated. She quickly recovered. You have seen her lately, and have noticed that the scar left by the incision is a very faint one, and is well hidden in the fold of the eyelid below the orbital ridge. The ulcer of the cornea has left that structure a little nebulous at its upper part, but in such a position as not materially to interfere with vision.

As has been said, this girl had sustained no injury to the eyelid. In this respect her case contrasts with that of a young girl whom we saw yesterday, with an abscess involving the eyelid at just the same situation as the one under consideration. This girl had received an unintentional blow over the eyelid by the hand of her mother. Discoloration of the eyelid followed the injury, and subsequently the abscess formed for which she sought relief at our hands.

There was in our patient M. J. no previous history of any eye-affection. She had suffered from influenza in 1892, and again during Easter of 1893. Beyond this, there is nothing in her general condition that calls for comment. She was weakly and anæmic-looking. Inquiry elicited that at the time the left eye commenced to be affected in the manner already described the right also became affected in the same situation in the upper eyelid. It was never, however, implicated in anything like a corresponding degree to the left, and the swelling subsided in the course of two or three days.

Bearing on the cause of the affection of the gland in this case must be remembered the account ascertained from the girl, which has already been hinted at. She had been passing through a great deal of trouble, she tells us, in consequence of the serious illness of her brother and the fear that the sickness would prove fatal. For a fortnight she cried for hours together. This would seem to be unusual with her, and she does not bear a lachrymose appearance. When the inflammation had set in she tried to cry, but was unable to find any tears. Then she managed to cry with the right, and ultimately the function on both sides has been restored.

In this connection I can tell you of an interesting case mentioned some years ago in the Transactions of the Ophthalmological Society by Mr. McHardy, in a discussion which took place on some lachrymal case. He referred to an old gentleman in whom both glands became suddenly and simultaneously enlarged, in consequence, as Mr. McHardy expressed it, "of a sudden and grievous bereavement which prompted him to weep, though, through fifty years' neglect, the habit had fallen so much into disuse that no visible tears were shed. He suffered for some days great inconvenience from such distention."

The interference with the secretion of tears in instances in which the lachrymal gland is involved has been pointed out, I believe, by other observers. It is, at all events, a matter to bear in mind, and is corroborative of your diagnosis. I am, however, disposed to think that in some instances of simple abscess of the outer part of the lid the flow of tears may be interfered with. A case at present under observation suggests this, and it appears possible that swelling contiguous to the gland ducts could by pressure limit the supply. I shall have occasion to refer to an instance of simultaneous enlargement of both lachrymal glands in a woman. The affection was subacute, but here there was a very marked interference with the secretory function of the glands. She said the change was considerable. She had tried to cry several times, but the tears would not come; from the right



FIG. 1.—Abscess of the lachrymal gland in a baby five months old.



FIG. 2.—Enlarged lachrymal gland of the right eyelid in a man aged fifty-five years.



FIG. 3.—Adenoma of the lachrymal gland in a woman of twenty-five years.

there was hardly any moisture, and from the left the secretion was much less than usual. On the subsidence of the glands to a normal condition, the secretion was re-established.

I have seen at least two cases similar to the one which I have just brought under your notice, and in which the gland suppurated.

At the same time that this girl was under treatment there was a little baby also in my wards, whom you will remember to have seen, as your attention was directed to him in connection with the one just related. The baby was only five months old, and came on September 29, in consequence of a swelling situated at the outer part of the orbit. The appearance at this time is admirably shown in the photograph (Fig. 1) which Mr. Bellamy kindly took for me. You will see that the eyelid at the outer part is prominent just in the same situation as was the case in our former patient, M. J. It was somewhat tender to the touch when first seen, but this disappeared, and there was no redness of surface nor feeling of heat. The child did not now appear to suffer much pain, if any. The history of the onset of this condition is by no means clear. According to the mother, the side of the face and the ear were at one time also swollen, but it would seem as if the real seat of disease had always been the orbital region, because as subsidence took place elsewhere it remained evident at this place. It appears, further, to have commenced when the babe was only a few weeks old. Inquiry fails to obtain any history of injury either at the time of birth or subsequently. The birth was natural, and no instruments were used. There has been no ear-disease, nor indeed any other affection.

A hypodermic syringe was passed into the swelling, and revealed the presence of pus, which was then let out through an incision along the orbital margin. We have seen the little patient quite recently, and noticed that all sign of the former distention has disappeared, both eyes looking alike.

I do not present this case to you as one of lachrymal disease. It may have been so, but to my mind the reason for the occurrence of an abscess under the circumstances, and also at the situation named, is by no means clear. My chief object, however, in mentioning it in this connection is that it was a case under treatment at the same time as our first one, with suppuration going on at the same situation, and that, owing to the kindness of one of your number, we have been able to preserve an excellent representation of the conditions present.

All cases in which the lachrymal gland is inflamed, it need hardly be said, do not go on to suppuration. Those that do so may ultimately, after a good deal of pain and swelling, point through the skin or

through the conjunctiva, and in some cases a fistula may result. There are cases, however, in which the glands become enlarged and painful and subside without the formation of pus. This last year a lady patient suffered from some swelling of the lids, especially on the left side; the enlarged lachrymal gland could be felt through the upper lid, and pressure gave some measure of discomfort; it was less easily detected on the right side, which was, during the few days that the condition lasted, but little affected. The patient was, I believe, gouty, but otherwise there was no cause discoverable. The œdema of the lids, which was the first symptom, as well as the enlargement of the gland, soon passed away.

Further back than this, a woman rather over thirty was attending here, with simultaneous dacryo-adenitis. The enlarged glands were visible in the eyelids and were evident to the touch. There was some œdema of both eyelids. The right side was more affected than the left. In a few weeks' time both glands returned to a normal condition. The interference with the secretion of tears in this patient has already been alluded to. (Transactions of the Ophthalmological Society, 1892.)

Under treatment at the same time in our wards as the girl M. J., whose case has been related at length, was a man (B. W.), aged fifty-five. He came for the first time on September 4, 1893, in consequence of a swelling in the right orbit. It had been noticed by him for three weeks. It came on quickly. There was during this time a good deal of pain, but there was not so much when he came to us. The right upper eyelid was œdematous, dusky red, but with no abnormal heat of skin. It closed a good deal over the eyeball, and he could not raise it sufficiently to expose the globe. To examine the eye it was necessary to pull up the lid. Through the eyelid could be felt what was taken to be the lachrymal gland; there was a well-marked edge, and it could be traced from the outer angle along the orbit almost to the inner; it was especially marked at the outer side. The gland margin was rounded and felt somewhat lobulated. On raising the eyelid, the ocular surface was seen to be reddened, and at the outer side, above, the conjunctiva was swollen. In addition, the globe was pressed downward and movement upward was interfered with. There was not at this time or subsequently any interference with vision. The accompanying photograph (Fig. 2) was taken a few days after his admission to the infirmary.

The diagnosis made was that the lachrymal gland was subacutely inflamed and attended with considerable enlargement. The cause was

obscure. He was a very healthy countryman from Lincolnshire, and had had no trouble recently, and indeed appeared from his account to have led a life singularly free from anything likely to cause any grief or trouble. There was no history of syphilis. The only conjecture the patient formed himself to account for the affection was that, as an agriculturist, he had before its onset been using "sheep dip." This lotion, employed for the sheep, was just then made particularly strong with sublimate. He had had no wound of the fingers, and even if affected in the manner he suggested there was no confirmatory evidence in other parts of such poisoning having taken place. In every other region he was healthy. There were no enlarged glands in the neck and no implication of the salivary glands.

He was treated at different times with iodide of potassium alone, and later with the addition of perchloride of mercury. Some increase took place in the size of the tumor after his admission, and then for some weeks it remained stationary. At this time I obtained the opinion of my surgical colleagues, who suggested the possibility of the tumor being malignant, and at all events thought that an operation for its removal might become necessary. There was no reason to adopt any such procedure immediately, and therefore he was allowed to go home into the country. He was to return in three weeks—or before, if worse. The date was October 27. He returned on November 17, with the tumor greatly reduced in size. The edge of the gland could still be felt along the margin of the orbit, but it was thinner and receded a great deal. The appearance of the lid outside had also improved. The change for the better had commenced only a few days before his return. He had ceased to take any medicine soon after leaving the infirmary. He remained with us for some days, during which time it was evident that the enlargement of the gland was abating. The only treatment adopted was a soda and gentian mixture. He again returned home, and revisited us on January 5 (1894). Improvement was now very marked. The gland had subsided so much that it was with difficulty felt with the finger, and then only after pressing well under the orbital margin. The eyelid was resuming a healthy appearance; ptosis was not, however, altogether absent; the ocular conjunctiva was normal, but the movement of the globe upward was still a little interfered with. Altogether, the progress had been most satisfactory, and when he returns again in a few weeks the right eye should be as normal as the left.

This man tells us that when he came here first the right eye was very dry, but that now, when in the cold, it becomes moist. Among

the points of interest that this case possesses may be mentioned the size to which the gland became enlarged, the displacement of the eyeball which it caused, and the resulting interference with the movements of the lid and globe. The reproduction of the adenoma (Fig. 4), to be referred to presently, also illustrates these points.

These cases which have thus far been brought to your notice present the gland as affected with acute or chronic inflammation. It is liable, however, to other conditions. I have seen two instances at least in which the lachrymal gland has been perceptible in each eyelid to the touch, but less evident to the sight, and also movable. One of these was a young man under treatment for corneitis, and there was reason to believe the condition was congenital. In both the distinctness with which they could be made out was their only abnormality. I have recorded a case also in which the gland became dislocated. The situation, size, and feel of the "lump" at once suggested that it was the lachrymal gland. It could easily be reduced, but almost immediately returned. One day, after I had replaced it and kept it in position for some time, it did not again make its appearance. The reason for the presence of this gland in the eyelid was not clear. He had, however, a large nævus at the margin of the orbit, and after "drinking bouts" the patient suffered from epileptiform convulsions, and I was informed that the nævus at the orbital rim became greatly distended during these attacks, looking as if it would burst. This nævus also passed into the orbit close to the upper and outer margin, and it appeared probable that the vascular engorgement might have had to do with separating the gland from or weakening its connective-tissue attachments. The distention of the same from the coughing with which he had been racked on the night previous to the "lump" being noticed should be remembered.

The lachrymal gland may also be the seat of simple or malignant growths. The only instance I have met with approaching the former condition is that of a woman who was in this infirmary several years ago with symmetrical tumors of the lachrymal glands, and with implication also on both sides of the parotid and other salivary glands. The disease was very slowly progressive, and she died five years after she had first come here, and long after she had passed from under observation. The tumors in all parts had greatly increased, and on the sides of the face had ulcerated, and her death was due apparently to exhaustion. The cases of this character on record are very few in number. When publishing this case last year (1893) in the *Lancet*, those already on record were dealt with.

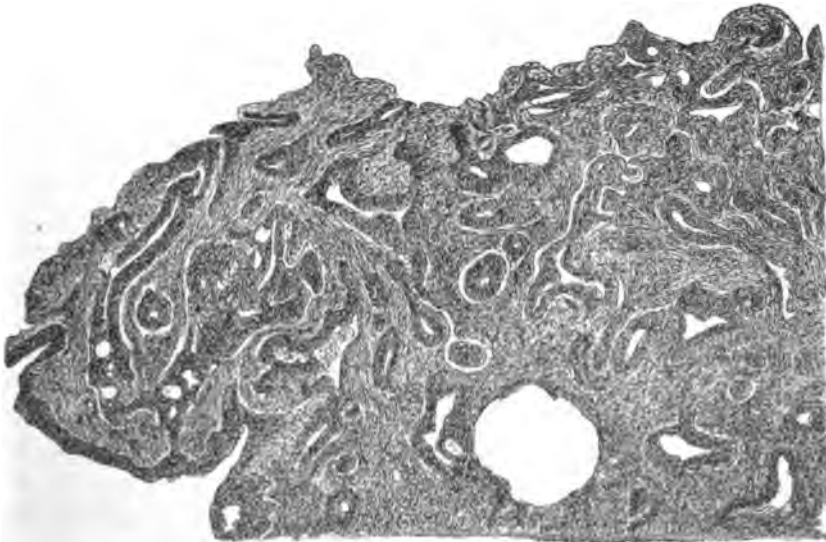
Two cases of adenoma of the gland have been under my care. One instance occurred in a domestic servant, aged twenty-five, and she was seen many years ago. It had been of slow growth, had been noticed at least from her sixteenth year, and had gradually become larger since then. It formed a hard tumor in the upper eyelid at the outer part, and it did not appear to be attached either to the lid itself or to the wall of the orbit, but rather to pass backward beneath the orbital margin. There was no tenderness, and no pain had been experienced. It pressed the eyeball downward and outward. The tumor was removed by making an incision extending outward through the external commissure. It easily turned out. It reached almost to the back of the orbit, being surrounded by cellular tissue, but not attached to bone. The tumor measured nearly one and a half inches by one and a quarter inches; it appeared encapsuled; immediately on its re-

FIG. 4.



Adenoma of lachrymal gland after removal.

FIG. 5.



Microscopic appearance of a section of adenoma of the lachrymal gland.

moval the eyeball returned to its normal position. The photograph represents the appearance of the patient (Fig. 3) before the removal of the tumor, and the drawing (Fig. 4) that of the tumor. A section of the growth under the microscope showed it to be distinctly adenomatous.

Acini of various shapes and sizes are seen lined with cubical epithelium. In some parts the acini are expanded to form cysts (*vide* Fig. 5). The other case was that of a baby, aged eight months. The tumor, on removal, was found to be the size of a bean. Its microscopic structure was similar to that of the other one.

These two cases have been recorded in the Transactions of the Ophthalmological Society, but the photographs of the first patient as she appeared before the removal of the tumor, and the drawing of the tumor and of its microscopic structure, have not yet been published.

With the help of the two cases which formed our text, I have now been able to bring under your notice the various cases in which the lachrymal gland was implicated which have from time to time come under my observation and of which records have been kept. They suffice to show that, though this gland may be but rarely affected, in process of time a single observer's experience may nevertheless be not inconsiderable.

SCLERAL PUNCTURE IN DETACHMENT OF THE RETINA, WITH ILLUSTRATIVE CASES.

WARD LECTURE DELIVERED AT THE PHILADELPHIA HOSPITAL.

BY G. E. de SCHWEINITZ, M.D.,

Clinical Professor of Ophthalmology in the Jefferson Medical College; Professor of
Ophthalmology in the Philadelphia Polyclinic; Ophthalmic
Surgeon to the Philadelphia Hospital.

GENTLEMEN,—In discussing the treatment of detachment of the retina in a previous lecture,¹ I described five procedures which have been employed at various times and are still utilized in the treatment of this condition. These were classified as follows: (a) the anti-phlogistic regimen; (b) the rest cure; (c) the instillation of myotics, particularly eserine; (d) the diaphoretic method; and, finally, (e) the various operative procedures. In order to place clearly before your minds the relative value of these different methods, the very interesting *résumé* published by Emil Grosz² was quoted. I will repeat the main points of this summary. Statistics gathered from various sources seem to show that in sixty-five per cent. of the cases puncture of the retina, in forty-four per cent. puncture of the sclera, in sixty-six per cent. iridectomy, and in fifty-nine per cent. pilocarpine injections, remained fruitless. Grosz doubts the trustworthiness of these results, because most of the authors were satisfied with an indefinite expression of improvement, without careful investigation of the visual acuity and the duration of the improvement. In contrast to these statistics, he records those from the ophthalmic clinic of Professor Schulek in Buda-Pesth. Sixty-seven cases of retinal detachment were treated by one or other of the following methods: puncture of the sclera, iridectomy, puncture of the retina, pilocarpine injections, combined puncture of the sclera and pilocarpine injections, and iodine injections after the method of Schoeler. Improvement was obtained in thirty-three per cent. with

¹ Therapeutic Gazette, January, 1893.

² Abstract in Nagel's Jahresbericht f. Ophth., vol. xxi. p. 95.

pilocarpine injections, with iridectomy in thirty-three per cent., with puncture of the sclera in twenty per cent., and with combined pilocarpine injections and puncture of the sclera in thirty-three per cent.

To one of these procedures—namely, scleral puncture—I desire to direct your further attention, chiefly because it may be recommended as the surgical method least likely to do harm and most likely to do good, but which should be employed, as should all other surgical measures in connection with this disease, only after a thorough rational medicinal treatment has been tried.

The curability of detachment of the retina by scleral puncture was first demonstrated by J. Sichel in 1859,¹ and the following cases are examples of the application of this operation. Inasmuch as they have been watched in one or two instances for a long period of time, they present some interesting features.

CASE I.²—Hugh M., a man aged fifty; laborer. The right eye was injured by a blast twenty-four years ago, and was considered by the patient to be valueless until his left eye was affected.

There is an irregularly oval pupil, with adherence of the iris to a small scar in the cornea, and a separation of the iris at the outer ciliary margin. Over the cornea are scattered several cicatrices. The remains of the capsule of the lens are seen to border the pupillary margin. It is not possible to obtain a view of the fundus, but the field of vision indicates that there is detachment of the whole lower half of the retina, with concentric restriction of the field furnished by the unseparated area.

¹ Hirschberg, in a paper entitled "Notes on the Operative Treatment of Detachment of the Retina," *Archives of Ophthalmology*, vol. viii., 1879, p. 12, inserts the following foot-note in regard to the literature of scleral puncture in the treatment of retinal detachment: "J. Sichel, in 1859, performed the operation on a myopic man, aged forty, with a lance-shaped knife downward, and raised the sight, which was very weak, to $\frac{2}{275}$. According to this, we have to correct the quotation of A. von Graefe (*Arch. f. Ophth.*, Bd. ix. 2, p. 35), which has been reprinted by several authors. Kittel (*Wiener allgem. med. Zeitschr.*, Nr. xxiii.) in 1860 operated on one case; Von Arlt at the same time on several (*Operationslehre*, p. 371); Wecker, in 1869 (*Jaeger-Wecker, Traité*), likewise recommended the operation. I witnessed one operation performed by the lance-shaped knife by Coccius, who informed me that he had proceeded in this way for years. Kries (*Arch. f. Ophth.*, Bd. xxiii. 1, p. 239) reported, in 1877, A. von Graefe's cases and recommendations. Pufahl described two cases operated on by me (*Centralbl. f. Augenheilk.*, December, 1877). Wolf (*The Lancet*, 1878, No. 15) describes scleral puncture as a new operation." Since 1879, the date of Hirschberg's writing, numerous operations for the cure of detachment of the retina by scleral puncture have been performed, and, as we have seen, in one series of cases at least, with twenty per cent. of improvement.

² The earlier history of this case has been described in the previous lecture, *Therapeutic Gazette*, January, 1893.

Fortunately, however, the macular region is not involved, and with a cataract-glass the patient's visual acuity is scant $\frac{20}{200}$.

The sight of the left eye was good until July, 1891, and then, while he was working, sudden blindness occurred. There has never been pain or inflammation. He consulted Dr. Sutphen, of Newark, New Jersey, who has very kindly furnished me with an account of what he did for the patient at this time. He was ordered to bed and treated by injections of pilocarpine, and later iodide of potassium was administered internally. There was a steady increase of the detachment until it became total, and scleral puncture was performed upon the left eye December 1, 1891. There was no reaction at all from the operation, except slight œdema of the conjunctiva, which lasted three days. Material improvement in the vision was noted from the second day following the operation. The patient remained in bed three weeks, and left the hospital January 15, 1892, with the retina in its normal position and vision $\frac{3}{8}$. The patient states that, contrary to Dr. Sutphen's orders, he returned to hard work, and very speedily his sight became as bad as ever. He declares that he was ashamed to go back to consult Dr. Sutphen, and well he may have been, because, owing to his own foolishness and disobedience, the benefit of Dr. Sutphen's excellent treatment was lost, and there has been a return of the disease, so that there is now an extensive detachment of the retina, which has involved the fixing point.

The disk which is visible is oval, and contains a small central excavation with a dot of pigment upon its margin. The detached retina floats up as a gray veil in the vitreous, which in its turn is filled with opacities, the lens is hazy, and there are a number of cortical opacities downward and inward. The accompanying diagram illustrates the field of vision, and was obtained by causing the patient to fix as nearly as possible upon a candle placed at the centre of the perimeter, while a large white test-object was utilized to map the field. (Fig. 1.)

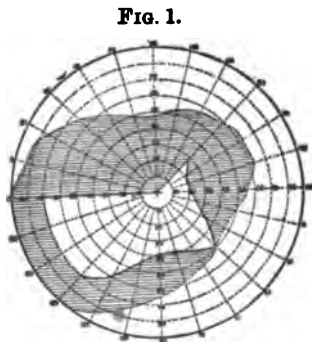


Diagram of the field of vision of Case I. nearly one year after scleral puncture had effected primary cure; relapse three weeks later. The outer line bounding the shaded area indicates the limit of the normal form-field; the shading, where vision was lost. All the other diagrams are constructed on the same plan.

For many reasons this was an unfavorable case from which to ex-

pect good results, but, as experience shows that harm does not follow the operation, and as the man was extremely anxious to have another trial, I performed at that time (December 2, 1892) the operation of scleral puncture, which is done as follows.

The precise position of the retinal detachment being ascertained, the eyeball is rotated in a suitable direction, a narrow Graefe cataract-knife is thrust directly through the sclera and choroid and turned slightly upon its axis, and the subretinal fluid is allowed to drain away beneath the conjunctiva. Very little reaction follows. Great care should be taken to perform a perfectly antiseptic operation, and, as Dr. Sutphen has suggested, the rotation of the eyeball back to its normal position, when released by the fixation forceps, virtually converts the scleral wound into a subconjunctival one, and this appears to be advantageous in preventing infection.

As the knife was turned upon its axis, the wound gaped, and there was an escape of serous fluid, forming a good-sized bleb beneath the conjunctiva. A double figure-of-eight bandage was applied, and the patient put to bed, and enjoined to keep upon his back as much of the time as possible.

FIG. 2.

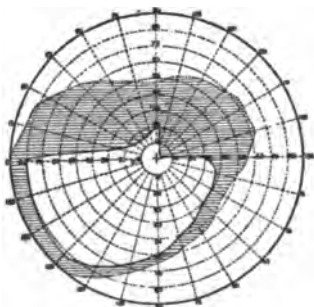


Diagram of the field of vision of Case I. two weeks after a second scleral puncture. Compare with Fig. 1.

FIG. 3.

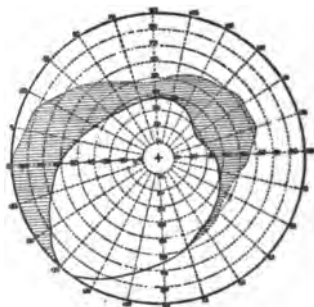


Diagram of the field of vision of Case I. two months after a second scleral puncture. Compare with Figs. 1 and 2.

Two weeks after the operation (December 16, 1892) a field of vision was obtained which is represented in the accompanying diagram (Fig. 2), somewhat resembling that obtained at the original examination, being slightly larger on the upper vertical meridian.

The rest treatment and bandage were continued, and on the 23d of January, 1893, or nearly two months after the operation, the field of vision as represented in Fig. 3 was obtained, and, moreover, in the ordinary way with the perimeter, the patient being able to fix fairly attentively a white spot in the centre of the perimeter semicircle. He

could count fingers readily in all directions, the previous vision having been light-perception only in the lower portion of the field. There was practically no change to ophthalmoscopic examination except that showing the partial reattachment of the retina. The patient was now allowed to be up, and there was no alteration in his vision, either for better or for worse, during the next few weeks.

He then disappeared from view, part of the time being out of the hospital and part of the time in an almshouse, and did not present himself again until the 8th of December, 1893, or almost a year after the operation.

The pupil then reacted faintly to the changes of light and shade when thrown obliquely into the eye, the lens was hazy, and there were numerous opacities in the vitreous, and apparently a complete detachment of the retina. Very faint light-perception was present in the lower portion of the field, but further than this a map at all accurate was unobtainable. He stated that the result of the operation had gradually disappeared, and he now depended for sight entirely upon his right eye, which amounted to counting fingers.

Once more he begged for the operation, and, although told that it could be productive of no favorable result, he still insisted.

Partly for diagnostic purposes, inasmuch as the tension of the eye seemed higher than ought to be present in one containing so large a detachment of the retina and so many vitreous opacities, a carefully performed scleral puncture with a very narrow Graefe knife was repeated, resulting in the draining away of a moderate quantity of serum slightly blood-stained. Whether, however, the staining of the serum was due to contamination from the blood of a small conjunctival vein which was incised, or not, could not exactly be told. The usual after-treatment of rest, bandage, etc., was tried until the 15th of January, and, in addition, iodide of potassium was administered. There was at no time reaction, nor was there the slightest effect upon vision, and there remains at the present time faint light-perception in the lower portion of the field, but the answers are so contradictory as to preclude the possibility of securing an accurate map.

The case may thus be summarized: primary scleral puncture by Dr. Sutphen resulted in a cure; relapse about eight weeks later. Second scleral puncture by myself resulted in a partial restoration of the visual field and moderate improvement in visual acuity, from light-perception to counting fingers; relapse after leaving hospital. Third scleral puncture, when detachment was total, wholly without result.

CASE II.—Peter D., aged thirty-seven; an iron-moulder; born in Ireland; became blind in the right eye one and a half years ago, suddenly, while lifting a heavy weight. The left eye was similarly affected four years ago. There is no history of blindness in his family; his general health, with the exception of malarial fever in 1873, has been good; he denies venereal trouble. He was always long-sighted. In the left eye there is faint light-perception, and this rather uncertain. There is no view of the fundus, the lens being cataractous.

In the right eye there is an extensive detachment of the retina, almost complete, the height of the detachment being +7 D. The disk is faintly seen, oval in shape, in its margins hazy. The vitreous contains opacities. Vision amounts to seeing the movements of the hand in the lower portion of the field. The field of vision is represented in Fig. 4.

FIG. 4.

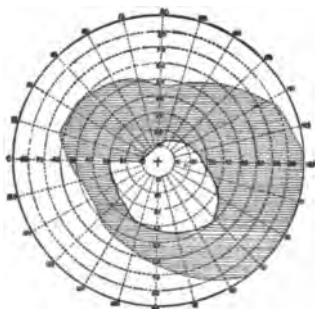


Diagram of field of vision of Case II., right eye, before the scleral puncture.

FIG. 5.

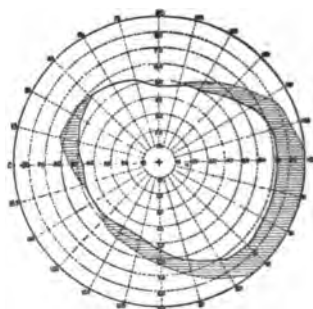


Diagram showing restoration of visual field of Case II. one week after operation.

November 10, 1893, scleral puncture was performed, the incision being placed between the inferior and the internal rectus, and there was a free escape of serum, at least half a drachm, forming a large bleb beneath the conjunctiva. The subsequent treatment was bandage, bed, and liquid diet.

One week later the ophthalmoscope revealed the retina completely in place, and the field represented in Fig. 5 was obtained. The lens was slightly hazy, and patches of disseminated choroiditis were visible. Vision equalled $D = XXX$ at one metre ($\frac{1}{30}$). The patient was kept in bed until the 24th of November, and then was allowed to be up for one day, but not to leave the ward.

On the 25th the fundus was slightly hazy, and directly below there was evident redetachment of the retina beginning, the apex of the elevation being +3 D. Fig. 6 illustrates the field of vision. The

patient was put to bed again, and kept there until the 7th of December, when he was allowed to get up, and the field was again mapped, giving practically the same result as Fig. 6, the area of retina in place being probably a little wider, and the vision amounting to $\frac{1}{2}$. The patient was now allowed to be out of bed and around the ward, and up to the final measurement of the visual field—namely, January 31, 1894 (Fig. 7)—the vision remained as last recorded. A second scleral puncture was not performed, although there is reason to believe that it would have been followed by a good result.

This case is very interesting, showing an almost complete success,

FIG. 6.

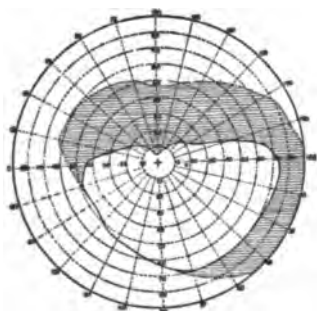


Diagram illustrating partial redetachment of the retina in Case II.

FIG. 7.

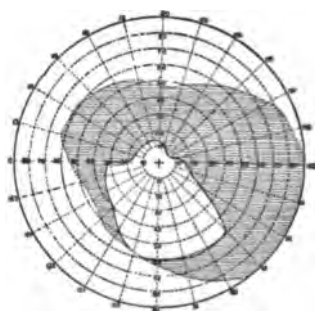


Diagram illustrating the final result on the field of vision of Case II.

so far as restoration of the field was concerned, while the patient remained flat in bed, speedy redetachment when he arose, although performing no more exertion than that of sitting and walking in the ward, and a final return to the primary condition of affairs, if we may judge from the two fields (Fig. 4 and Fig. 7), with, however, the preservation of central acuity of vision ($\frac{1}{2}$) far in excess of that which he had before the operation,—viz., movements of the hand in the lower part of the field.

CASE III.—Frederick D., aged fifty-six; American-born; a tin-smith by trade; gives the following history: the vision of the right eye failed two and a half years ago, that of the left eighteen months ago, neither of them suddenly, the dimness of the left eye starting as a cloud in the lower part of the field and lasting for one month before sight was practically obliterated. He was under treatment in the Wills Eye Hospital during April, 1893, with pilocarpine injections. His general health is good, and there is no account of excesses in his life. He never used glasses for close work.

The right eye sees vaguely the movements of the hand down and

out, but cannot count fingers. The disk is oval, gray-red in color, contains a small cup, and there is a huge detachment of the retina, almost complete, which floats upward into the vitreous. (*Vide* Fig. 8.)

On the 24th of November, 1893, two scleral punctures were performed, one between the inferior and the internal rectus and one between the inferior and the external rectus, each being followed by the escape of a small quantity of clear serum beneath the conjunctiva. No immediate ophthalmoscopic change was visible. The usual treatment of rest in bed and bandage was kept up until the 7th of December, without, however, any practical change either in the field or in visual acuity.

Although a distinctly unfavorable case, at the man's earnest request,

FIG. 8.

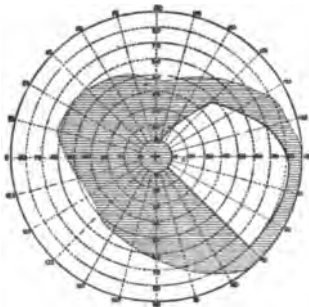


Diagram of the field of vision of Case III., right eye, illustrating extensive detachment of the retina.

FIG. 9.

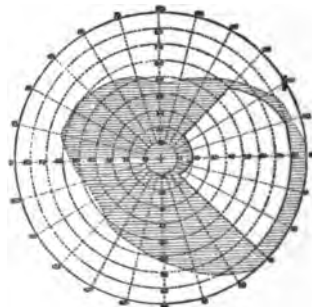


Diagram of the visual field of Case III. after operation, practically without favorable result.

and as there had not been the slightest reaction, a third scleral puncture was performed. The incision, after consultation with my friend Dr. Charles Kollock, of Charleston, South Carolina, who was visiting the wards at the time, was made on the temporal side, just below the margin of the external rectus muscle. When the knife was turned and the wound made to gape, an unusually large quantity of clear, straw-colored fluid escaped, which formed a large bleb beneath the conjunctiva. The patient immediately stated that his vision was better. This, however, was probably an expression rather of his own anxiety that it should be improved than of what was actually the case.

The bandage, rest in bed, and the internal administration of iodide of potassium were continued until the 4th of January, 1894, when practically no change was visible with the ophthalmoscope, and the field of vision (Fig. 9) was obtained, which may be compared with the one originally found (Fig. 8), closely resembling it in all particulars.

Down and out the patient could distinguish the movements of the hand, but could not certainly count fingers. When the eye was last studied (on the 31st of January, 1894), there was practically as complete a detachment of the retina as there had been originally. The pupil was slightly pear-shaped, and, unless the rays of light were skilfully directed upon the small patch of retina still functionally active, the iris was immobile to the changes of light and shade.

Still hoping that his left eye might be benefited by a similar operation, and, curiously enough, insisting that his vision was better, although no improvement could be demonstrated, an operation was performed on this eye.

CASE IV.—Frederick D. *Left eye.* The pupil was round, reacted sluggishly to light-impulse, the lens was slightly hazy, the disk was dimly seen as a vertical oval of gray-red color, and containing a small, sharp central excavation. There was extensive detachment of the retina, as is evident from the field of vision. (Fig. 10.)

FIG. 10.

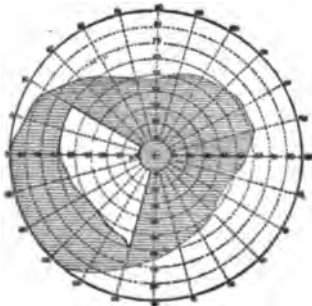


Diagram of the field of vision of Case IV., left eye, showing extensive detachment of the retina.

FIG. 11.

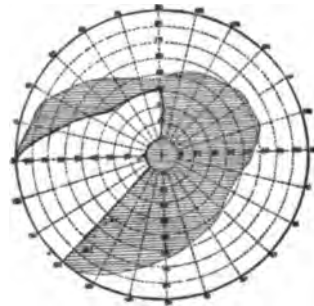


Diagram of the visual field after operation in Case IV. Slight improvement.

Two scleral punctures, performed January 5, 1894, resulted in a moderate escape of straw-colored fluid, without, however, any immediate ophthalmoscopic change. One month later, after almost continuous rest in bed, during most of the time with eyes bandaged and continuously taking iodide of potassium, the patient was allowed to get up and the field of vision carefully mapped, resulting in the accompanying diagram. (Fig. 11.) This, when compared with Fig. 10, will show a slight improvement; so slight, however, that it is doubtful whether the improvement was the result of the operation, or whether, in a case so difficult to determine accurately the limits of the still functionally active retina, there may not have been some error in making the measurements.

It will thus be seen that in the case of Frederick D. there was practically no improvement (and also no harm), although in one eye there were three scleral punctures and in the other two, each of which was followed by the escape of subretinal fluid, in one instance in large quantities. This case belongs to what Hirschberg would call the unfortunate examples of total detachment of the retina which are not likely to be benefited by any operation or form of medication.

These four cases, or, to speak more accurately, three patients and four eyes, have been selected from a number because they illustrate the various results which are likely to follow an operation of this character, namely :

1. That primary relief or cure may be expected in idiopathic retinal detachment after scleral puncture, but that relapses are frequent, even while the patient is still in the hospital, and that they are almost sure to occur if, as in Case I., even some time after the operation, the subject of the disease performs work requiring special exertion.

2. That although the operation seems justifiable while there still remains light-perception, chiefly because, under proper precautions, no harm can result, it is extremely unlikely, even when it is followed by the free escape of serous fluid, that there will be any reattachment of the retina when the separation has been a practically total one, as, for example, in Case IV.

3. That occasionally, even when there has been a primary cure, so far as the restoration of the field of vision is concerned, followed by a relapse, the gain in central visual acuity seems to remain, although the field indicates that the redetachment has equalled the original separation, as, for example, in Case II.

Finally, I have brought these cases to your notice because all of them were exceedingly unfavorable, as all were detachments of long standing, and occurred in eyes which showed, in addition, other extensive degenerative changes. Therefore we may assume that in a similar series—which, however, should be very much more extensive if any safe conclusions are to be drawn—of favorable cases, fairly creditable results might be obtained ; indeed, these, as you know from the statistics already quoted, have been secured.

Of course a very important point is to determine the suitable time for operation, and in the earlier cases on which this operation was performed, many years ago, it was claimed that the most advantageous results were obtained in recent cases. Graefe, however, maintained that the process of spontaneous descent of the retinal fluid should first be awaited, or, in other words, that at least six weeks should elapse

before operative interference was undertaken. Hirschberg, in the paper already referred to, coincides with Graefe's opinion, and believes that in an ordinary myopic retinal detachment at least eight or ten weeks should expire after the onset of the affection before scleral puncture should be performed. At the same time it does not do to wait too long, lest the perceptive power of the retina depreciate. In

FIG. 12.

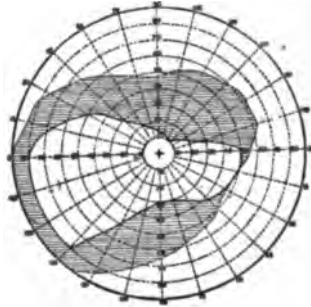


FIG. 13.

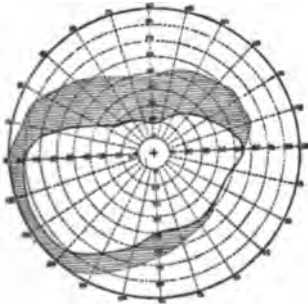
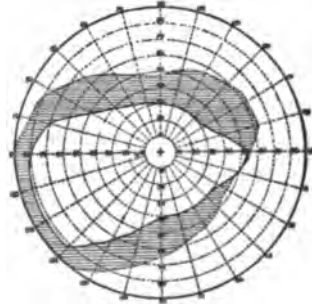


FIG. 14.



Illustrating the changes produced by the instillation of a solution of eserine in a case of detachment of the retina.

closing his paper, Hirschberg states that an extended experience will have to decide these points and designate the best period for the repetition of the operation. This experience has come, in large measure, during the last ten or fifteen years, without especially modifying the principles he then laid down.

Were I to judge solely from my own experience, which is probably not different from that of many other operators, I should be inclined, after a thorough medicinal treatment, especially pilocarpine injections, iodide of potassium, and salicylic acid, to employ scleral puncture, with the understanding that after the operation the patient should remain in bed for at least six weeks with the eyes bandaged, and should then be

permitted to rise only with the understanding that no violent exertion was permissible.

Although not strictly pertinent to the surgical treatment of this affection by scleral puncture, I desire, in closing, to refer to a case quoted in the former lecture (*loc. cit.*), which had been treated with instillations of eserine according to the recommendation of Guaita, who states that under these circumstances he has obtained amelioration of the symptoms and increase of the visual field, although there was resumption of the symptoms on ceasing the use of the drug. In one of my cases thus managed, the accompanying diagrams (Figs. 12, 13, and 14) illustrate graphically the effect of the instillation of this myotic drug. Although there was slight increase in the size of the visual field,

FIG. 15.

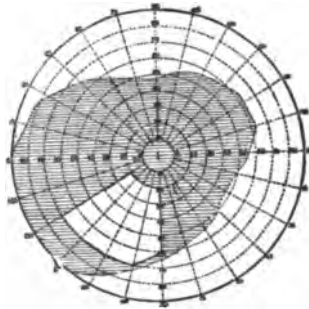


Diagram of the visual field of the case treated with eserine. Result after three years' use of this myotic.

central vision did not improve. This patient has reappeared within the last few days, and I insert a diagram of the field of vision as it is at present (Fig. 15), obtained with the aid of a candle-flame, and exhibiting only a small patch down and out where there remains light-perception. Strange to say, this patient, a highly myopic woman of twenty-eight, has used the eserine solution (a twelfth of a grain to the ounce twice a day) almost continuously since the original fields were mapped out, now more than three years ago. Certainly no improvement could be ascribed to the effect of the drug.



FIG. 1.—Anna L., congenital ptosis, before the operation.



FIG. 2.—Anna L. after the operation for the relief of ptosis.

CONGENITAL PTOSIS; EPITHELIOMA OF THE EYELID; OPERATION FOR THE RELIEF OF TRAUMATIC ECTROPION.

CLINICAL LECTURE DELIVERED AT THE WESTERN PENNSYLVANIA MEDICAL COLLEGE.

BY EDWARD B. HECKEL, A.M., M.D.,

Lecturer on Ophthalmology and Otology at the Western Pennsylvania Medical College; Oculist and Aurist to the J. M. Gusky Orphanage and Home for the Aged of Western Pennsylvania, and the Home of the Friendless, Pittsburg.

GENTLEMEN,—The cases before you are not strange to most of you, as I have referred to them on several occasions. My chief object in bringing them here again is to show you the results of a few plastic operations on the eyelids. In order to get the full benefit of a case, it is necessary not only to witness an operation, but to follow it in its subsequent course.

The first patient whom I introduce to you is Anna L., aged fourteen years, who consulted me in March last. Her father gave the following history. The left eyelid has drooped ever since birth, completely covering the eyeball and presenting a peculiar appearance, such as is photographed in the picture which I pass around (Fig. 1).

Parents are always ready to assign some cause for any defect that may be present in a child. In this instance the father states that the patient was one of twins, and that her twin brother's foot had pressed against her eye during intra-uterine life, producing the condition present. By a supreme effort the patient was able to elevate the lid by a contraction of the forehead, due mostly to the action of the occipitofrontalis muscle. Upon elevating the lid with my finger, the eyeball presented a perfectly normal appearance, and followed the other eye in all its excursions, except when the eye moved upward, showing that the superior rectus muscle of the eyeball was likewise involved in the paralysis. The pupillary reflex was normal. The vision of the left eye was $\frac{10}{200}$, that of the right eye was $\frac{20}{20}$.

The refraction, as shown by the ophthalmoscope, was found to be about normal in each eye; in other words, the condition was that known as congenital ptosis. In many of these cases (which are rare, however) we find the patient able to elevate the lid by a supreme effort of opening the mouth,—that is, by depressing the lower jaw. In this patient such was not the case; even when the lower jaw was depressed, the upward movement of the lid was slight, scarcely more than when the jaw remained closed or fixed. Congenital ptosis, as stated by some authorities, is usually found to be bilateral; but in this case it was monolateral, being confined to the left eyelid. The treatment in such a condition, of course, would be purely surgical, although it is never advisable to operate upon a congenital case of ptosis in early youth; by that I mean at the age of three or four, for very frequently these cases improve as the child grows older, sometimes regaining almost their entire functional activity; consequently an early operation might prove in later years an over-correction.

The operations devised for the relief of this condition are numerous, and the mere fact that such is the case is indicative of one thing,—namely, that no single operation is suitable for all cases; and it is an operation which should be coolly deliberated upon before undertaking it, for there are certain dangers connected with it: you may operate and under-correct,—that is, after the operation is completed, the eyelid may still droop some, enough perhaps to interfere with the pupillary space; and, on the other hand, you may over-correct,—that is, interfere with the patient's closing the eye, and hence expose the eyeball to all sorts of external influences, which may eventually lead to corneal ulcers and complete destruction of the eyeball.

The chief object of an operation in this case was a cosmetic one, as the left eye is amblyopic, and will very likely remain so, though some improvement in vision is to be looked for. As it was, the young lady presented a rather peculiar appearance, the left eye remaining closed at all times, and consequently detracting very much from her general appearance.

The old method of operating upon such cases as this was that devised by Von Graefe, which consisted in the excision of some of the fibres of the orbicularis muscle. The object aimed at was dual: first, the weakening of the orbicularis, which is the antagonist of the levator; and, secondly, the subcutaneous shortening of the lid. The effect of this operation, in most cases, was but slight, and the result disappointing. Since then other operations have been devised, the principle of which depends upon the fact that the occipito-frontalis muscle can



FIG. 3.—Mrs. S. M., epithelioma of the lower eyelid, before the operation.



FIG. 4.—Mrs. S. M. after the operation.

be called in to perform the service of the disabled levator. The first operation involving this principle was devised by Pagenstecher, and consisted simply in the insertion of two subcutaneous sutures, which entered near the free border of the lid and emerged above the eyebrow. They were allowed to remain *in situ* until some evidence of suppuration developed, when they were removed. The object of this procedure was to induce slight suppuration along the course of the sutures, which would result in a cicatricial band, thus uniting the lower portion of the lid with the occipito-frontalis muscle. This operation was later modified by Wecker, who first excised a crescent-shaped piece of integument overlying the muscular fibres, and used sutures similar to those of Pagenstecher. This operation is one which at times, and in the hands of some operators, has given very good results.

There is still another operation, which is known as Panna's, the purpose of which is the direct union of a tongue-shaped flap of integument from the lid to the occipito-frontalis muscle. This is accomplished by making an incision along the upper border of the tarsal "cartilage," interrupted for a distance of about five millimetres at its middle portion. A second incision is then made, parallel to the first, just below the eyebrow. This one is carried down deep and is continuous. A third incision is then made, parallel to the second and just above the eyebrow. Then the first and second incisions are united by two vertical ones, after which the tongue-shaped flap is carefully loosened from the lid down to the free border of the same. Then the tissue of the brow is so undermined as to unite the second and third incisions, forming a free bridge of integument, under which the tongue-shaped flap is pushed, so as to unite it with the upper lip of the incision above the eyebrow. This is accomplished by means of two looped sutures which enter the tongue-shaped flap and pass under the bridge of tissue and emerge at the upper lip of the topmost incision, after which they are drawn tight and tied, thus elevating the lid. This operation, as briefly described, is the one which was followed in the patient before you. The patient was anæsthetized and strict antiseptic precautions observed. The upper incision was united by three interrupted sutures, so as to insure union by primary intention. The wound was then dressed with powdered boric acid and bichloride gauze, one to five thousand, and overlaid with absorbent cotton and secured by a roller bandage. The following day the patient was resting easily, pulse and temperature normal; hence the dressing was not removed, but the eye was redressed on the third and fifth days. On the seventh day the sutures were removed and the bandage left off. During this time there

was not the slightest evidence of any pus. The lid, of course, was somewhat swollen, and the immediate effect of the operation was obscured. This swelling gradually disappeared, and with its disappearance an improved condition of the eyelid was noticed. So that to-day, after a period of about three months, the patient stands before you with both eyes open, and has her lids under perfect control (Fig. 2).

The second patient is Mrs. S. M., aged forty-three years, who came to me at the beginning of April last with the following history. About a year and a half ago the patient noticed on the left lower eyelid, near the inner canthus, what she described as a pimple. She had never had it treated, save with home remedies. It gradually grew larger. At that time it presented an indurated, open sore about seven millimetres long and about four millimetres wide, near the inner canthus, involving the free border of the lid, which was destroyed for an extent of four millimetres. The ocular conjunctiva was not involved. The sore was covered over with a thin crust, the removal of which caused it to bleed freely. Her family history, as near as could be elicited, proved negative. In cases of this kind it is a matter of some importance to arrive at a diagnosis, so as to be governed in the treatment. Considering the age of the patient and the course of this sore, we are immediately led to suspect some malignant growth, and the one which we should expect to find is epithelioma. The situation of the sore is almost typical of epithelioma of the eyelid (Fig. 3). It matters little in these cases whether we arrive at a positive diagnosis or not,—that is, within certain limits; always satisfy yourself whether it is specific or not, as our treatment should necessarily be of a surgical character in all, save when specific, when the usual remedies should be resorted to. The application of caustics in a location of this kind would result in the destruction of the tissue and the eyelid, and leave an unsightly cicatrix, as well as expose the eyeball.

The patient was anaesthetized, and with the usual antiseptic precautions the operation was begun, the first step being the excision of the malignant growth, which was carefully dissected out and the remaining wound curetted, so as to remove all possible fragments of diseased tissue. The bleeding was somewhat profuse, but was easily controlled by the application of a hot bichloride solution. The next step was the formation of a flap to fill in the gap left after the excision of the growth. This was done by means of a sliding flap from the cheek. An incision was made parallel with the free border of the remaining portion of the lower lid; there remained about one-third of it. This incision was carried horizontally across the cheek to the base



FIG. 5.—John L. after the operation for the relief of traumatic ectropion.

of the ear. Another incision was then made, beginning at the lower border of the wound and carried down to the lobe of the ear, after which it was dissected up, care being taken to dissect only the integument with a small amount of the underlying tissue. Care was also taken to preserve the vitality of the flap by means of a towel wrung out of a hot bichloride solution. After it was thoroughly loosened it was slid over into place and trimmed so as accurately to fill up the gap left by the excision of the growth, and made fast by interrupted sutures. Silk was used in this case, and in all there were twenty-four sutures, which were dusted over with boric acid, then covered with wet bichloride gauze, over which some absorbent cotton was placed, and the whole secured by means of a roller bandage. On the following day the patient was resting easily, suffering no pain, with pulse and temperature perfectly normal, consequently the dressing was not removed. On the second day, however, the dressing was removed, and the line of sutures was found to be perfectly dry. It was then redressed and allowed to remain closed for two days longer, after which the sutures were removed and the dressing left off. So that in this case we had union by primary intention without the slightest trace of pus, and the patient, as you see her to-day, has this malignant growth removed and an eyelid which is quite serviceable, answering all necessary purposes, and presenting no special disfigurement, save two lines of cicatrices which will gradually grow less (Fig. 4).

The third case to which I desire to call your attention is that of a child, John L., aged one and one-half years, who met with an accident some months ago which produced a wound of the right upper eyelid, which became infected and suppurated, resulting in the complete destruction of the eyelid. The cicatricial band of tissue which had formed had contracted in such a manner as to leave a condition of extreme ectropion. The palpebral conjunctiva was turned out, forming a bulbous mass completely covering the eyeball. The conjunctiva, of course, being very much irritated by its exposure to external influences, the only result in a case of this kind would be a destruction of the exposed conjunctiva and an ultimate loss of the eyeball. The method of procedure first contemplated was the operation known as Wolfe's, which consists in the transplantation of a flap without a pedicle; but the results of this operation are so varied that it was decided best not to employ it in this case, but to use instead a sliding flap with a pedicle. The technique of the operation was as follows. The child was placed under a general anæsthetic, in this case chloroform being used. After cleaning the parts thoroughly with a solution of bichloride one to

five thousand, an incision was made about two millimetres from the edge of the lid and parallel with it, extending from the inner to the outer canthus, and a similar incision was made along the orbit, parallel with the orbit, the inner point uniting with the lower incision, the outer extremity being three millimetres above the lower incision, thus including the entire amount of cicatricial tissue, which was then excised, care being taken not to include the underlying muscular fibres. The bulbous mass of conjunctiva was then turned in and the lids placed in position. In this case I did not suture the lids together, as is recommended and as is very frequently done, but the lid was simply allowed to remain in place. The next step was the preparation of the flap to fill in this gap. The flap was taken from the temple by making a vertical incision at the extremity of these two parallel incisions, carrying it upward and slightly forward, but not allowing it to encroach on the tissue of the forehead. Another incision was made, beginning at the upper extremity of this incision, carried downward and slightly backward, so as to leave a flap about six millimetres in width. This was then carefully dissected, with a small amount of underlying tissue, and was then slid into place, covering the defect of the lid, when it was found to be accurate without trimming. In this case, as in the other, care was taken to preserve the vitality of the flap. After all bleeding had ceased, the flap was secured by means of interrupted sutures. The gap left by the removal of this flap was then drawn together by several interrupted sutures, the edges of which approximated very nicely, after which a dressing similar to the one described in the foregoing case was applied. The wound was allowed to remain closed for forty-eight hours, after which it was opened and all found to be doing nicely. It was redressed, and opened again two days after, at which time the sutures were removed, and in this case, as in the former one, we got union by primary intention. So that at the present time, a few months after the operation, we have the child with a useful eyelid, which can be opened and closed at will. The only deformity at present is a somewhat thickened eyelid and a vertical scar on the temple. This thickening of the eyelid has gradually become less, as no doubt some of you have noticed, since you have had the privilege of seeing the patient several times during the healing process, and the eyelid will probably improve very much as the child grows older. At any rate, we have given the child a useful eyelid and preserved a perfect eyeball, which no doubt would have gradually been destroyed if the ectropion had persisted (Fig. 5).

In performing plastic operations great care and deliberate judg-

ment are essential. Do not be in haste to operate, but carefully consider *what* you intend to do and *how* you are going to do it. When at all possible, use a flap with a pedicle, and always bear in mind that your flap will shrink, and that due allowance must be made for the shrinkage. The flap should be about one-third larger than the space to be filled ; then, with proper care and neatness, you are quite sure to achieve success.

TREATMENT OF TRACHOMA BY EXPRESSION AND BY OTHER METHODS.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POLYCLINIC.

BY THOMAS R. POOLEY, M.D.,

Professor of Ophthalmology in the New York Polyclinic; Surgeon-in-Chief to the
New Amsterdam Eye and Ear Hospital.

GENTLEMEN,—This boy, whom I have shown here before, has had both of his eyelids subjected to the operation of expression of the trachomatous follicles. The operation is quite painful, and cocaine anæsthesia does not seem to be sufficient to allay the pain; hence the operation, under these circumstances, is not apt to be done so thoroughly. You notice that in the eye operated upon under general anæsthesia there are no trachomatous follicles to be seen, and the lid is almost well. The result is certainly far more satisfactory than that which would follow in the same time from the use of the sulphate of copper or other similar means. The expression of the follicles may be done with instruments, preferably with the forceps of Noyes or Gruening, or the roller-forceps devised by Knapp; but most convenient of all is the use of the perfectly clean finger-nails.¹ The operation is exceedingly tedious and uninteresting, and I think that any device which would control the hemorrhage would be a valuable help in the performance of the operation. The conjunctiva is naturally very vascular, and this condition is much increased when trachoma is present. The hemorrhage which accompanies the operation of expression prevents you from seeing distinctly how thoroughly you have removed the trachomatous follicles. I think in the future I shall not only employ ether, but shall also thoroughly cocainize the eye, for cocaine, if employed to a sufficient extent, is a good hæmostatic. It is almost impossible to treat thoroughly all the follicles present, but do

¹ I have given up the use of the finger-nails and now use Knapp's roller-forceps altogether.

this as nearly as possible, and then rub the surface thoroughly with sulphate of copper, with the idea of exciting a very severe hyperæmia which will absorb the remaining granulations.¹ The reaction following this operation has never been sufficiently severe to alarm me, although the lids swell very much. Cold applications should be employed continuously during the height of the inflammation, and then, as it subsides, they may be used at intervals of one or two hours. The conjunctiva rarely returns to anything like the normal condition until some time after the operation, and you might expect this because of the thickening of the conjunctiva which is the result both of the trachoma and of the traumatism of the operation. The operation has yielded much better results than the treatment by bluestone. I mention the bluestone treatment because I do not think there is any other treatment for granular lids, in the way of applications, to be compared with it. After the reaction which is directly due to the operation the conjunctiva remains thick, and if any trachomatous granulations are still present I employ the sulphate of copper, carefully, every day or two, just as I would in an ordinary case of trachoma. In cases of diffused or of long-standing trachoma which has already been subjected to operation, the follicles are not isolated, but are agglomerated by inflammatory action, and much of the exudation is subconjunctival, and therefore expression of the follicles under these circumstances does not promise a good result. This operation of expression is apparently a revival of an old method, and we must guard against the enthusiasm that so often leads astray those who attempt new methods of treatment. Examining the results with a critical spirit, but without prejudice, I think we may say that they are sufficiently good to encourage us to continue its use.

A word or two might be said here about the inconsiderate way in which the diagnosis of trachoma has often been made. Nearly every case in my own hospital, for instance, in which there is a chronic swelling of the conjunctiva, with elevations, is dubbed "trachoma." Now, trachoma is comparatively rare, and the cases which are so misnamed are usually those of chronic follicular conjunctivitis, or more or less acute inflammation with enlargement of the papillæ of the conjunctiva. Some of the treatises very confusedly call this papillary trachoma. Increase in size of pre-existing elements of the conjunctiva, such as the papillæ, does not constitute a disease, but is simply an expression of an

¹ Further experience has taught me that this is not necessary, the thorough expression alone being sufficient.

inflammatory condition, and not an indication of an organic change in the conjunctiva. The truth is that trachoma, as found in this boy, is an essentially different disease; it is one which is characterized by the formation of a pseudoplasm of a different kind of tissue from that which exists in the conjunctiva, and, so far from yielding readily to treatment, as do these other conditions, it is in all instances essentially inveterate in its character, and it has the quality of destroying the tissue in which it has its birth. All recuperation from a true trachomatous process is at the expense of the integrity of the conjunctiva, and in this respect trachoma is a good deal like tuberculosis.

Without going too much into the details of the pathology of trachoma, I may say that these forms of true trachoma require to be treated in such a way as to bring about absorption of the trachomatous process with as little injury as possible to the conjunctiva. If you let granular lids alone, many of them make a fair recovery. I wish to remark just here that if, after the treatment has been carried to a certain point and the patient appears to be comparatively comfortable, you relinquish treatment, the progress to recovery goes on as well as if you had continued the treatment, if not better. Your object should be to aid nature in the treatment of trachoma. Let me caution you especially against the use of powerful escharotics. The treatment of granular lids by the use of nitrate of silver in stick, whether, as was formerly done sometimes, by the pure stick, or, as in later years, by the mitigated stick, has been very largely discontinued. Some employ solutions of nitrate of silver, and these are not so harmful. I recently saw a gentleman from Idaho who had been very variously treated for a number of years for granular lids. So powerful had been the remedies employed that there were numerous symblepharon bands in the lower conjunctival cul-de-sac which very much restricted the movements of the eyes upward. The granular condition had nearly disappeared, but the results of the treatment were fully as bad as the original disease. This patient said that, except when there was unusual purulent secretion, vaseline or cold cream kept his eyes far more comfortable than any of the remedies which had been employed.

The treatment of granular lids, excluding for the present the methods of expression and grattage, is reduced in my practice to the employment of the sulphate of copper. You should be guided in your treatment by the chronicity of the condition. Acute trachoma is very rare, but should you meet with it where, in addition to the usual trachomatous process, there is excessive swelling, with much secretion and pain, which is very considerably aggravated at some times of

the day, and where the whole condition simulates an acute catarrhal inflammation of the conjunctiva, remember that such a case should be left alone, so far as the use of astringents is concerned. Your only aim at such a time should be to prevent the inflammatory condition from reaching too great a height. If you find that there is danger of implication of the cornea, you should make use of cold applications. This will be very seldom necessary. On the contrary, sometimes, if there seems to be a subsidence of the acute symptoms, and the case tends to become one of chronic trachoma, you may increase the hyperæmia by using hot applications and keeping the eyes thoroughly cleansed.

In chronic trachoma, if the case come to you at such a period that the operation we have been considering is no longer indicated, the application of sulphate of copper should be made in such a way that the whole surface of the conjunctiva where the granulations are present is touched with the bluestone. The immediate comfort of the patient, the amount of suffering you inflict, and the final good results all depend very largely upon the manner in which you make this application. The lid being everted and the patient told to look down, so as to expose as far as possible the whole extent of the conjunctival cul-de-sac, you should make the application with a perfectly smooth crystal of the sulphate of copper, and this crystal should be flat, sufficiently long to reach the depth of the cul-de-sac, and sufficiently thin to admit of its being carried between the conjunctiva and the globe. It should be applied very lightly once or twice over the exposed part of the conjunctiva, and then carried between the upper lid and the globe, so as to touch the whole conjunctival surface in the reflection fold. Then immediately wash off the whole surface with a camel's-hair brush dipped in water. Your attention should be next directed to the lower cul-de-sac, the patient looking upward, so as to expose this surface. This likewise is washed after the application. The next important step is to decide how often these applications should be repeated, and I think that in every case at the outset, and especially in private practice, where explicit directions are expected, you should require the patient to come to you daily for some time. The object of this is that you may see whether the applications should be made daily or at longer intervals. The amount of reaction caused by the application depends very largely upon the person who makes it, or rather upon the lightness of the touch employed. In many institutions no subsequent washing is employed, and the patients, under such circumstances, must suffer half an hour or more of pain, and, in addition to this, I am not sure but that such treatment also does harm. The crystal of sulphate of copper

should not be left moist, and, as this salt tends to absorb moisture from the atmosphere, it should be kept where this cannot occur, for the surface then becomes quite rough, and such a crystal is very apt to leave behind in the cul-de-sac a minute fragment of sulphate of copper, which will of course cause much suffering.

If you find on the day following the application that the reaction has not yet subsided, then postpone the application until the next day. In an old case of trachoma a touching of this kind produces a favorable effect upon the patient's feelings within fifteen minutes, and in these cases you can very properly touch the eyes daily; but if there have been much pain, inflammation, and secretion, it is better to defer the application for one or two days. Bear in mind, then, that your object is not to *burn* the granulations, for such treatment certainly causes scars and a worse condition than would result from not treating the granulations at all. The applications are to be made in such a way as to cause sufficient inflammation in the lids to bring about *absorption* of the granulations. The one other essential feature of the treatment is to keep the conjunctiva clean, and this part of the treatment is to be done at home. The patient should be carefully instructed about washing out the cul-de-sac, and, since we know that all such directions are more carefully followed if we give a written prescription, we may prescribe a solution of bichloride of mercury or boracic acid, chlorate of potassium or common salt, all of which are excellent remedies. These all accomplish the cleansing I have insisted upon, and hence you should see that they are frequently repeated. Much aid is derived from the use of hot applications, which favor the action of the sulphate of copper by increasing the vascularity of the membrane, thus favoring the absorption of the granulations. They are grateful to the patient, and in chronic trachoma I almost invariably advise their use.

So far I have been referring to the treatment of cases where there is no corneal complication. Trachoma, however, does not exist for a long time without implication of the cornea. The commonest way in which the cornea becomes affected is by the upper third of it becoming vascular,—the condition we call pannus. Your treatment will depend upon whether you think the condition is produced entirely by the rubbing of the rough lids over the cornea, or hold to the view that the trachomatous extension to the corneal epithelium is responsible for it. Probably both conditions favor it, but careful microscopical examination of the corneal tissue shows that there is an extension of the trachomatous process to the corneal epithelium,

and cases in which there was ulceration of the cornea have been seen by competent observers where the trachomatous process has even extended into the interior of the eye. Some patients may come to you for the first time with this vascular condition, and you are at once led to suspect the existence of granular lids. You should determine by careful inspection of the cornea whether or not there is an extension of the trachomatous process to the epithelium of the cornea, and this will be usually shown by an examination with oblique light. If such be the case, you will see minute yellowish millet-seed spots in the cornea in addition to the deep-seated vascularity or pannus. If this condition be present, it is best to touch these spots gently with the sulphate of copper at the same time that you touch the lids. Dr. Gruening has recently practised scraping of the cornea in these vascular conditions, but his cases have not yet been published, and I am not well acquainted with this method, although I should consider it probable that such a procedure would be successful. I think this scraping should be done only when the lids are comparatively well, for if the raw surface were exposed to the granulations they would almost certainly become infected. The use of atropine in trachomatous pannus is to be deprecated, and, as a rule, atropine is not to be resorted to in trachoma unless there be infiltrations and ulcerations, for in most cases it aggravates the trachomatous process.

BLENNORRHOËAL CONJUNCTIVITIS; ITS ETIOLOGY, DIAGNOSIS, AND TREATMENT.

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY HOSPITAL.

BY ALBERT RUFUS BAKER, M.D.,

Professor of Diseases of the Eye, Ear, and Throat in the Medical Department of the University of Wooster, Cleveland, Ohio.

CASE I.—This child, as you see, is a typical case of old granulated lids. I do not present it because there is anything remarkable about the case, but on account of its history, which is an instructive one and may help us to arrive at some knowledge of the etiology of the disease.

The history of the case is as follows. About three years ago an infant sister of this little girl suffered from ophthalmia neonatorum. Within a few days another child of the family, about two years of age, was attacked with a severe purulent conjunctivitis. When the case came under my observation a few days later, the cornea of one eye was perforated, the eye being entirely destroyed, and there was a large central ulcer of the cornea of the other eye. The child was immediately put in the hospital, and with vigorous treatment and careful nursing fair vision was preserved in that eye. Some months later this still older child was brought to my office suffering from granulated lids. She has been under my observation almost continually since that time, and, as you see, has almost recovered. The case was first treated with nitrate of silver, and afterwards the granulations squeezed out with Knapp's roller forceps, which seemed to aggravate rather than benefit the disease, as I have found this treatment to do in other cases of true granulated lids, though it is of inestimable value in the treatment of follicular conjunctivitis. You will notice, instead of the normal appearance of the conjunctiva, the peculiar cicatricial appearance which it presents; also that the palpebral opening is somewhat narrow, the lid drooping, giving the peculiar sleepy expression to the eyes so characteristic of old cases of granulated lids. This peculiar appearance is of diagnostic importance. We can often say that a patient has suffered from a certain disease from the tracks it leaves (although the

disease itself may be entirely cured), the same as when a hunter in the woods finds chips he will be certain that an axe-man has been there.

CASE II.—We have here another interesting case bearing upon the same subject. This gentleman comes here from Michigan for treatment. He has been under the care of various physicians during the past three years.

Upon examination we notice the peculiar drooping of the upper lid and the shortening of the palpebral opening, as in the other case, but affecting only one eye. Upon everting the upper lid we do not find the cicatricial appearance. The lid is rough and covered with the peculiar granulated bodies from which the disease derives its name. The upper half of the cornea also has a peculiar fleshy appearance, which we call pannus.

This man is an Israelite, about forty years of age. His occupation is that of circumcising children according to the rites of his church: he has made between five and six hundred circumcisions. He has kindly consented to show us his instruments and the dressing which he uses, and will relate to you the method which is pursued by him. You will notice that he purposely permits his thumb-nails to grow very long for tearing the mucous membrane. But the particular thing to which I wish to call your attention is the entire absence of antiseptic precautions, and the ease with which the blennorrhœal poison may have been carried to his eyes. I think it is altogether probable, in his case, that this was the origin of the eye-trouble, as well as in the case of the little girl who contracted a purulent ophthalmia from her baby sister three days old. The point I wish to emphasize is that gonorrhœa, purulent conjunctivitis, and granulated lids are due to the same cause. I am aware that this is not in accordance with the teachings of your text-books. But if I were going to write a text-book on the diseases of the conjunctiva, I should make a somewhat different classification from that usually given. I think I should make a classification as follows:

Irritative Conjunctivitis.

Catarrhal Conjunctivitis { Acute.
Chronic—Follicular Conjunctivitis.

Blennorrhœal Conjunctivitis { Acute { Ophthalmia Neonatorum.
Gonorrhœal.
Chronic—Granulated lids.

Phlyctenular Conjunctivitis.

Diphtheritic Conjunctivitis.

Strictly speaking, the affection which I have called irritative con-

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junctivitis is not conjunctivitis at all, but a hyperæmia of the conjunctiva due to eye-strain, generally the result of an error in refraction. I should not speak of it in this connection if it were not so frequently mistaken and treated for granulated lids by ignorant practitioners. The disease is characterized by a feeling of irritation in the eye, as though there were sand in it; an excessive flow of tears; considerable photophobia; a frequent desire to rub the eyes; often a blurring of sight, especially in the latter part of the day. It is often associated with blepharitis marginalis. The conjunctiva is slightly redder than normal, and there is a slight exaggeration in the normal velvety appearance of the conjunctiva, which is so frequently mistaken for granulations. There is little or no muco-purulent secretion; no sticking of the lids together in the morning; no thickening of the lids or narrowing of the palpebral opening, nor any of the serious symptoms characteristic of granulated lids. Irritative conjunctivitis occurs more frequently among the most intelligent people of a community, because they are most apt to abuse their eyes.

Granulated lids is a rare disease and seldom met with among the better class of patients. In fact, we saw but a few cases in Cleveland until the recent influx of Russian Jews. It would scarcely seem necessary to call the attention of a class so intelligent as this to the differential diagnosis between diseases which have so little in common. And I should not do so if it were not for the fact that I meet doctors all over the country who are subjecting patients who need nothing but a pair of spectacles to a long and severe course of treatment which does great harm. It is not uncommon to meet doctors in Cleveland in general practice who are treating scores of cases for granulated lids, while I doubt if any specialist in the city has seen that many cases in a year.

Follicular conjunctivitis, which is a chronic form of catarrhal conjunctivitis, is frequently mistaken for granulated lids. It is to be regretted that our text-books are not more definite in their description of this condition. I think it is now generally recognized by oculists that there is an essential difference between follicular conjunctivitis and granulated lids.

CASE III.—This is a case I have had sent over from one of our Children's Homes. A few years ago I found twenty-five per cent. of the inmates of this institution suffering from follicular conjunctivitis. At my last visit this was the only case I found. The improvement of the condition of these children's eyes is undoubtedly due to the improved hygienic surroundings. Upon examining the palpebral con-

junctiva you will see several small oval yellow-pinkish prominences about the size of a pin's head. These are tumefied lymph follicles; they are not so high nor so prominent as the ordinary hypertrophied papillæ present in all conjunctival inflammations. This child complains of the ordinary symptoms of chronic catarrhal conjunctivitis,—a slight sticking of the lids together in the morning, a feeling as of sand in the eyes, a frequent disposition to rub the eyes, a slight photophobia; and all these symptoms increase when the eyes are used for reading or close work.

These cases are common in residential schools, orphan asylums, prisons, and garrisons; also in the lower walks of life and wherever large numbers of people are crowded together, especially if occupying ill-ventilated rooms, where the atmosphere is vitiated, and there is absence of sunlight. The management of these cases consists in improving the hygienic surroundings. Remove all exciting causes, and they will usually recover without any treatment; but as long as the patient remains surrounded by filth and dirt the disease will continue for months and years without improvement under the most vigorous treatment. In fact, the ordinary astringent and caustic treatment applied to granulated lids will in that case only aggravate the disease.

One of the essential differences between this disease and granulated lids is its tendency to get well without leaving any deformity of the lid. Cases in which the follicles cause no unpleasant symptoms are best let alone without treatment. In other cases a solution of boracic acid instilled into the eye frequently, and a small amount of dilute citrine ointment placed between the lids before retiring, will give the best results. If more radical measures are deemed necessary, the use of Knapp's roller forceps will give most satisfactory results.

There is much diversity of opinion as to the etiology. Many eminent pathologists believe it to be due to contagion; others, that it is caused by dust, filth, bad air, bad food, and unhealthy surroundings. I am inclined to accept this latter theory.

CASE IV.—This old lady comes to us with the following history. She says she has suffered with inflamed eyes for one and a half years; that first one eye was affected, and a few months later the other; she was under the care of several practitioners, who repeatedly brushed her lids; afterwards she went to one of the dispensaries, where she was treated twice a week for several months by an eminent oculist; when she was faithful in her attendance and had the lids brushed regularly twice a week with nitrate of silver or rubbed with blue stone she was comparatively comfortable; during the past two months

her health has not been good, the weather has been bad, and she has not been regular in her attendance, and the eyes are now more painful than at any previous time.

She wishes to have some radical measures taken to relieve her of this painful affection. As you will see, the upper lid is thick and oedematous. She shuns the light, and it is impossible for her to open her eyes widely. The left eye is the more painful, but she can see better with it than with the right, which is almost blind. We find the right cornea almost entirely covered with pannus, and on the left there are several small ulcers along the sclero-corneal margin. These are what cause the intense pain and photophobia of which the patient complains. You will notice that there is considerable purulent secretion, and upon everting the lid it presents a red, thickened, and somewhat uneven surface. These changes are due to hypertrophy of the mucous membrane, and constitute the characteristic feature of granulated lids. It does not seem possible that this great thickening of the entire lid, with effusion of fibro-plastic material into the subconjunctival tissue, should be mistaken for ordinary follicular conjunctivitis, such as that presented by Case III. ; or for the slightly hypertrophied papillæ characteristic of irritative conjunctivitis.

We shall now give this patient an anæsthetic, and take this common tooth-brush and cut it down about two-thirds and thoroughly brush the lids with a 1 to 500 solution of mercuric bichloride. I have found this the most efficacious method of treating such cases. It sets up an intense inflammatory reaction, and as the inflammation recedes much of the effused fibro-plastic material will be carried away and the lids will be much thinner than before. The principle is somewhat the same as that by which the surgeon will cure an effusion into the knee-joint by the application of the actual cautery externally, and, indeed, I believe this is nature's method of curing the disease. The reason we do not have more cases of granulated lids following ophthalmia neonatorum or gonorrhœal ophthalmia is that, owing to the intensity of the inflammatory reaction, the disease cures itself, although it often destroys the eye in doing so. It has been the custom from time almost immemorial in extreme cases in which vision was almost entirely lost from granulated lids to resort to inoculation, usually with pus from a recent case of ophthalmia neonatorum. In more recent years we have resorted to the use of jequirity. An infusion is made from the jequirity bean and is brushed upon the lids, which causes an intense purulent ophthalmia nearly, if not quite, as violent as that due to inoculation.

I believe this method of brushing the lids with a strong solution of bichloride is destined to supersede most of the older procedures.

Operation.—The patient is anæsthetized, and the face and eyes thoroughly scrubbed with soap and water; the granulated lids are brushed vigorously with the tooth-brush, which is repeatedly dipped in the bichloride solution; there is free bleeding, which is washed off with a bichloride douche by an attendant; the lids are dusted with acid and covered with gauze, cotton, and a roller-bandage. The patient was ordered to bed, and an ice-bag applied to control pain.

From what I have said before you will readily conceive that I believe blennorrhœal ophthalmia and granulated lids to be identical,—one an acute and the other a chronic form of the same disease. We might compare the acute blennorrhœal disease to an acute gonorrhœa, and granulated lids to a gleet. Further, I believe that the primary origin of the disease is probably referable to the secretion of genitals affected with gonorrhœa, and that this secretion produces in the human conjunctiva acute blennorrhœa, which may become chronic, and then we call it granulated lids, or trachoma. The disease is most frequently communicated from one eye to another, probably by means of towels, handkerchiefs, fingers, etc., but it is not infrequently contracted more directly from its first source, as in the case of the child whom I first presented to you to-day.

Laryngology and Rhinology.

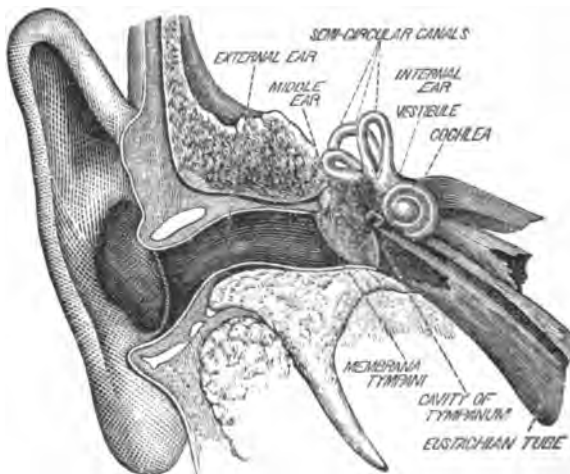
CHRONIC NON-SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.

CLINICAL LECTURE DELIVERED AT ST. LUKE'S HOSPITAL, CHICAGO.

BY S. J. JONES, M.D., LL.D.,

Professor of Ophthalmology and Otology in Northwestern University Medical
School (Chicago Medical College), Chicago.

GENTLEMEN,—I have arranged to present to you to-day a number of cases of chronic non-suppurative inflammation of the middle ear, grouped together to illustrate an affection that has been regarded as among the opprobria of otology,—that large class furnishing the most frequent cause of progressive impairment of hearing. In addition to



Vertical section, showing external, middle, and internal ear and Eustachian tube.

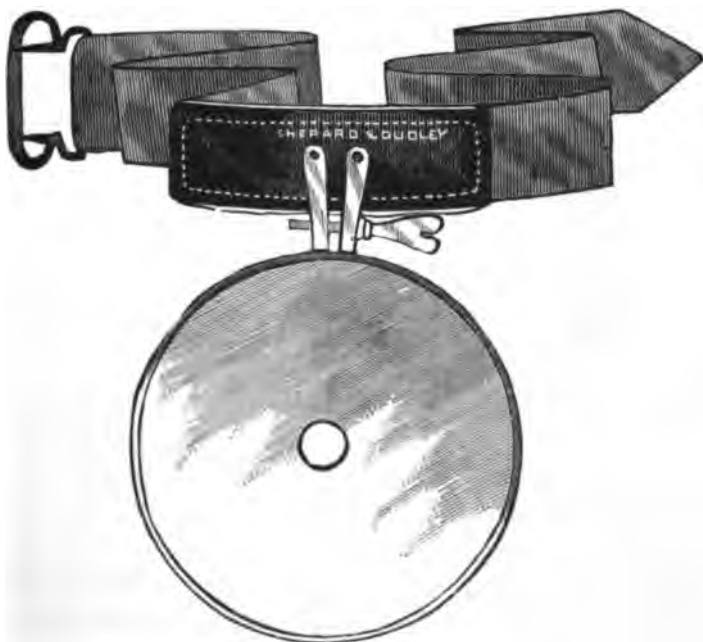
the cases in the hospital I have requested some of my private patients to present themselves, that you may have an opportunity of witnessing the fact that no age and no climate seems to exempt people from this

affection. The cases that will be presented to you manifest several



Jones' compound otoscope.

allied conditions producing the same result, impairment of hearing, not total deafness. They vary from youth to old age.



Trötsch's mirror, with head-band.

The first is A. B., sixteen years of age, who is, as you see, in appar-

ently vigorous health, of good constitution, and the son of healthy parents. Although a native of an Eastern State, most of his life has been spent at his present residence, San José, California. His case is one of hypertrophy of the tissues of the middle ear. Inspection of



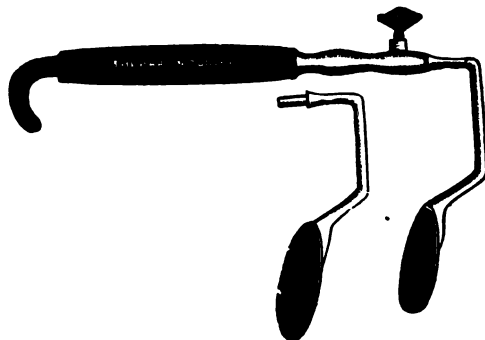
Trötsch's mirror, with handle.

the external meatus shows normal shape, but absence of the normal secretion of cerumen. The drum-heads are unnaturally concave externally. Instead of presenting the normal pearly-gray appearance, the membranes are less translucent than normal. They look more like parchment or ground glass. The change in the shape of the drum-head has diminished the size and modified the appearance of the reflection of the light thrown upon it,

which should appear as a sharply-defined triangle, the apex of the triangle being at the central part of the membrana tympani, and its base in the anterior and inferior quadrant. The nostrils are nearly normal in shape and condition. Inspection of the pharynx shows follicular enlargement and altered mucous secretion. In testing hearing with a watch as a convenient, though inaccurate, test of the hearing-power, it will be perceived that he does not hear it tick when as remote from his left ear as from his right, the hearing-distance being five inches with the left ear and eight with the right. This corresponds with the usual result in examination of ears, in which it is generally found that the left ear is more frequently affected and more changed than

the right one. On testing with a vibrating tuning-fork it will be noticed that he hears the fork more readily also with his right ear through the ordinary conducting apparatus, but when that vibrating fork is brought in contact with the teeth the sound, through bone-conduction, is heard more loudly in the left ear than in the right, which is frequently a cause of great surprise to patients. Because they hear the ticking of a watch at a greater distance with the better ear, they are apt to answer, when asked with which ear they hear the vibrating

tuning-fork better when placed against the teeth, that they hear it louder in the ear with which they have heard the tick of a watch



Türk's tongue-depressor.

better ; but upon fixing their attention closely upon the matter when requested, to their astonishment they find that it is heard louder and quicker



Tuning-fork.

in the more affected ear. This patient is not an exception to that rule. He is more fortunate than many in not being troubled with tinnitus aurium, which patients frequently say is much more annoying to them than their impairment of hearing. It is more apt to occur in patients more advanced in life, as is also aural vertigo. These patients manifest a susceptibility to atmospheric and telluric influences as marked as in rheumatic patients. This one is not an exception in that respect, either. Great and sudden changes of temperature quickly modify the hearing-power. Even though a change in the weather be from bad to more favorable states, if that change be great, hearing is apt to be worse for a few days, until the system shall have adapted itself to the altered atmospheric conditions.



Nest of ear-specula.

The next patient is a young man, C. D., twenty-three years of age, a resident of Walla Walla, Washington. His vocation is that of a

butcher. He has resided for a number of years in that climate, which is regarded as one of the most favorable in our territory for affections such as that now under consideration. His business has not unduly exposed him to unfavorable weather, and the calling is not usually considered an unhealthy one. His general physical condition also indicates nearly perfect health. His case, however, differs from the preceding one in the absence of hypertrophy of tissue, on the contrary showing atrophy of the conducting apparatus, notwithstanding his excellent health. On inspection the external meati and the drum-membranes present almost exactly the same appearance as in the preceding case. In many of these cases the lining membrane of the Eustachian tube, instead of being hypertrophied, thus diminishing its calibre, is sufficiently atrophied to make the calibre abnormally large. Such patients frequently complain of a great sense of fatigue following a sustained effort to hear, saying that it is sometimes more exhausting to them than a moderate amount of manual labor. One of the early evidences of diminishing acuteness of hearing is less power of accommodation of the ear, dependent in part, probably, upon paresis or atrophy of the tensor tympani muscle. In case of atrophy, persistent and annoying tinnitus is more apt to occur than in hypertrophy of the tissues. This may be in part dependent upon contraction, especially of the fibrous layer of the drum-head, thus, by pressure through the ossicles, forcing the stapes too firmly into the foramen ovale, producing undue pressure in the labyrinth. In these cases fluctuations in the hearing-power are also less frequent, because the air in the middle ear is not apt to be rarefied, and, in consequence of that, inflation of the middle ear does not even temporarily improve hearing as much as it does in cases where hypertrophy of the mucous lining of the Eustachian tube exists.

The third case, E. F., is a resident of this city, seventy years of age, not well nourished physically, but enjoying average good health. He has had impairment of hearing for over thirty years. The origin of the disease causing it is unknown. It is not believed to have had its start in any of the eruptive diseases, nor in any marked pharyngeal inflammation that he remembers. It is the same history so often given, that an accidental circumstance drew attention to the fact of slight impairment of hearing, which perhaps existed for a considerable length of time before being recognized, but had occurred so gradually that the patient had become accustomed to the changing condition and did not realize it. Moreover, frequently one ear—generally the left—is considerably affected, but, the other being in a better condition, the defect

is not noticed in conversing with persons immediately in front of the patient or on the side of the better ear. In this way the existing condition of the diseased ear is overlooked until some special circumstance draws attention to it and the hearing-power of each ear is tested separately. In these cases usually there has never been pain enough in the ear to have attracted attention, a circumstance that is in one respect unfortunate for the patient, for, had the inflammation been of a higher grade so as to have been accompanied by swelling and pressure enough to produce pain, attention would have been drawn to it, and the most favorable time for treatment would probably not have passed before the patient realized the necessity for proper care of his ears. This fact, and this condition, which is usually in an advanced stage when recognized, afford some explanation of the difficulty experienced in treating these defects successfully, which has led to their being regarded as a reflection upon otologists. All three of these cases have shown an absence of the normal secretion of cerumen for the protection of the external meatus, due to its suppression, because primarily of the condition within the middle ear. In other cases ear-wax is secreted, but not in its normal condition, and therefore does not pass to the outer part of the external meatus under the influence of the movement involved in the act of mastication. Being secreted in a drier state than natural, it is retained, gradually becoming harder and darker than the normal rosin-colored appearance of the wax. Often it accumulates to such an extent as to fill the meatus. In some instances, when removed by the use of alkaline solutions, it is found that the dermoid layer of the external meatus and membrana tympani is thrown off, showing almost a perfect cast of the lining of the meatus and of the outer layer of the drum-head. This condition constitutes another factor in producing impairment of hearing by blocking up the external meatus, but it is a condition which never occurs in a healthy ear; therefore the general impression which obtains, that if such an accumulation be removed, it is all that is necessary to be done. Such is not the fact. The case should subsequently be properly treated to remedy the condition which has produced this state as one of the consequences of the abnormal condition of the remainder of the conducting apparatus.

Without such treatment the accumulation usually occurs with increasing frequency and with greater change in the conducting apparatus, further increasing the impairment of hearing.

The fourth case, G. H., is a patient fifty years of age, also a resident of this city, of fair average health, and with similar impairment of hearing. There is no accumulation of ear-wax in the external meatus;

on the contrary, there is itching of the meatus, with a scaly condition of its walls resembling in appearance slightly moistened flour. Examination has shown this to be the parasite *aspergillus*, which is accompanied by persistent pruritus in the meatus, causing a desire, that is almost irresistible, to rub and scratch the affected part, which is frequently done until such chafing has been produced as results in circumscribed or diffuse inflammation of it. This pruritus, though generally in a less marked degree, is a very general accompaniment of the absence of normal secretion of ear-wax, and has its origin usually in inflammation of the middle ear, with interruption of normal secretion in the conducting apparatus, which makes a state of the parts favorable for its occurrence.

The hopeful feature of all these cases is that the lesion is confined almost entirely to the *conducting apparatus*; the perceptive apparatus being but little, if at all, affected by the imperfect circulation and consequent malnutrition.

The next case is I. J., a young man twenty-three years of age, of full average physical development, with good family history, a carpenter by trade. Inspection of his ears shows an accumulation of dark, hard ear-wax in each ear, not, however, filling the meatus. It is in such a condition that it can be removed by means of a small metallic ear-scoop. On removing it we find opaque drum-heads quite scarred,



Gross's ear-scoop and hook.

showing the fact of perforation in the drum-head having occurred early in life, so early, in fact, that he has no remembrance of it. This shows another feature that is not generally understood by the public,—viz., that perforations in the drum-head are not fatal to hearing and are not always and necessarily permanent; but that, on the contrary, the drum-head being well-nourished tissue in the acute stage of a suppurative process, with good nutrition of the parts, closure of openings of moderate size made by discharge from the middle ear occurs readily when the inflammation has subsided and the consequent abnormal secretion has ceased. This case of non-suppurative inflammation at least had its origin in that condition. The inflammation subsided; the excessive secretion ceased, and the perforations closed, leaving the cicatrices; but such structural change had occurred in consequence of that inflammatory process that there have always been since then rigidity

of the tissues, more or less contraction, and altered secretion of ear-wax combining to interfere with the transmission of sound to the perceptive apparatus. It is found also on inspection that there is considerable follicular pharyngitis, and that the same condition extends up through the posterior nares, diminishing the lumen of the nostrils and interfering with ready breathing through the nostrils, a condition which has led to the designation of such patients as "mouth-breathers," and the affection as *aproxexia*, a condition that is unfavorable because the air is not tempered by passing through the nostrils to the pharynx; but, on the contrary, breathing through the mouth causes evaporation from a larger surface of mucous membrane, producing a dry state that is undesirable, and there is not the sifting of the atmosphere by the short, stiff hairs of the nostrils to prevent the passage of irritating particles floating in the atmosphere into the pharynx. There is then a non-suppurative condition in this case as a consequence of a previous suppurative inflammation, differing in that respect from all the preceding ones.

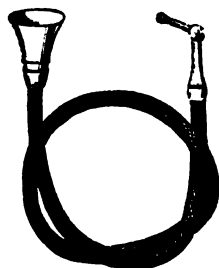
These cases give some idea of the range of age and other attendant circumstances which produce these conditions. They are found as sequelæ of eruptive diseases, sometimes of acute suppurative processes; at other times it is difficult to trace the origin or the time at which the inflammation commenced. Too often patients are seen only in an advanced stage of the trouble. You will have noticed in these patients a result similar in character from two opposite conditions,—namely, one of hypertrophy, the other of atrophy, each influencing unfavorably the conducting apparatus.

An advance has been made in later years in recognizing the fact that these conditions which produce gradual impairment of hearing are affections of the conducting apparatus, whereas not many years ago they were all considered as cases of progressive nervous deafness. This condition, although chronic in character, may from adverse influences be lighted up into subacute or acute simple inflammation or even suppurative inflammation, thus adding another factor of danger. Such acute aggravations occur most frequently in this lake region in the latter part of winter and in early spring. Next to this time the most unfavorable period for them is during the hottest weather of midsummer.

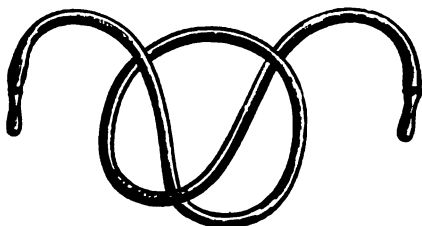
In their chronic stage they are usually dangerous only as impairing the function of hearing; but when lighted up, as they frequently are, by the great and frequent changes in the atmospheric conditions in the latter part of winter and spring, resulting in a higher grade of in-

flammation, another factor of danger is added,—danger to the life of the patient, by extension of the inflammation from the middle ear to the meninges of the brain and the brain itself, often resulting in death.

Diagnosis of these cases is not difficult. Inspection of the external ear to the drum-head enables one to determine the existing condition. The vibrating tuning-fork held near each external meatus and subse-



Conversation tube.



Diagnostic tube.

quently placed, whilst vibrating, against the teeth demonstrates the fact that the lesion which produces impairment of hearing is not a defect in the perceptive power of the auditory nerve. Thus by exclusion the seat of the difficulty is narrowed down to the middle ear and the Eustachian tube.

Treatment of these cases is a much more difficult matter, and it must vary with the two principal forms of hypertrophy or atrophy.

Prognosis is more favorable in cases of hypertrophy than in cases of atrophy. Bearing in mind the changes which have taken place in each of these two forms, they will guide in the modification of the treatment adapted to each condition. In cases of hypertrophy, usually, the mucous membrane of the naso-pharynx has been so modified by inflammatory action that it is thickened and the secretions are altered in amount and character. That same condition usually extends through the Eustachian tube and involves more or less the middle ear. With that hypertrophy there is sluggish circulation, passive congestion. There is a debilitated state of the tissues, making them less able to resist adverse influences which periodically aggravate the existing condition.

In treatment, cleansing of the mucous surface is important, in order to get rid of this altered secretion, which has practically become foreign material, and when retained adds to the irritation of the parts. Its removal also permits more thorough medication of the diseased mucous membrane, not only of the naso-pharynx, but also of the Eustachian

tube and middle ear. For this purpose many devices have been resorted to at different times, the so-called nasal douche, the use of which is not free from danger, being one of the means of effecting its removal ; the use of a syringe for the posterior nares has been another method



Hard-rubber nebulizer and bottle.



Complete steam-atomizer.

of cleansing. Perhaps the most agreeable as well as the most efficacious mode of effecting this removal is by inhalations of alkaline steam from an atomizer, breathing through the mouth—some of it escaping through the nostrils as well as through the mouth. It practically is an application of the principle of a poultice to soften the secretions, effect their removal, and soothe the inflamed membrane. Although the steam will not under these circumstances enter the Eustachian tube, the effect upon the naso-pharynx will also be produced, though in a less degree, on the lining of the Eustachian tube. Where no abnormal perforation of the drum-head exists, the only route to the Eustachian tube and middle ear is either through the nostril or through the mouth. Advantage is usually taken of the nostril as the more direct route to these parts.

For the purpose of inflating the middle ear three principal methods are resorted to. The *first* of these, known as Valsalva's method, consists in closing the mouth and nostrils and expelling air from the lungs, which, because it cannot escape from the mouth or nostrils, is forced through the Eustachian tubes into the middle ear. The *second*, known as Politzer's method, is the reverse of Valsalva's ; in it advantage is taken of the fact that the act of swallowing closes the soft palate against the posterior wall of the pharynx, thus bridging over the space, and while in that condition, if air be forced through one nostril, the other being closed by pressure to prevent its escape, the air is rendered more dense in the naso-pharynx, and in that way is forced through the Eustachian tube into the middle ear.

In the *third* method the Eustachian catheter is introduced gener-

ally through the nostril to the opening of the Eustachian tube and air is pumped through that into the middle ear. Inflation simply with air is most serviceable in cases of hypertrophy with diminished calibre of the Eustachian tube frequently occurring in children. Where the air has become rarefied in the middle ear such inflation will usually temporarily increase more or less the hearing-distance of the ear inflated. Where such inflation does not increase the hearing-distance, the structural change is usually chiefly within the cavity of the middle ear, and experience shows that the prognosis is less favorable.

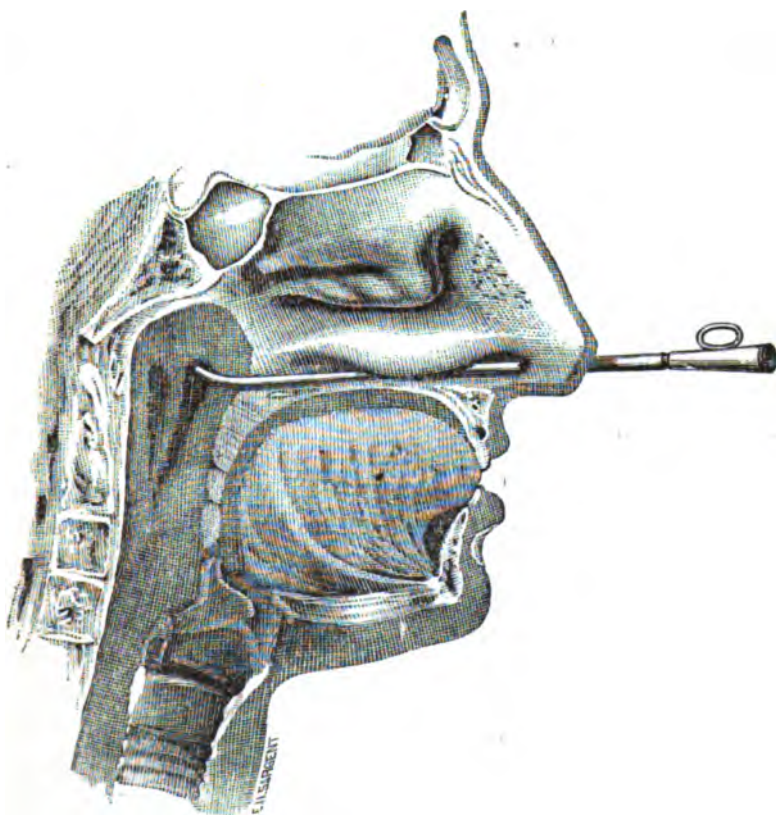
The defects in what is known as Politzer's method of inflation are that the bulb used for inflation is larger than is necessary, thus exerting more violence upon the parts than is justifiable, and that where the Eustachian tubes are unequally open most of the force is exerted upon the more open or less affected ear, and also that the air thus forced in has no therapeutic effect, the result being simply mechanical. Therefore a method of treatment which combines with mechanical inflation proper medication to remedy the existing condition is what the case demands. Here some latitude exists in the selection of remedies to be used. It should be borne in mind that there exists the third or chronic stage of inflammation of a mucous membrane with the usual structural changes of such chronic inflammation of that membrane. The necessity for decided stimulation of the parts in that stage is recognized the same as elsewhere. The ear should be no exception so far as the principle is involved. The delicacy of the structure, as well as its importance, necessitates some modification in the method of applying the same principle. Of all remedial agents used, probably none on the whole has given such satisfactory results as iodine.



Pure silver Eustachian catheter (natural size).

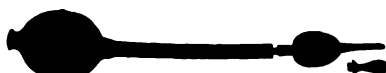
Air is medicated with iodine and forced through the Eustachian tube into the middle ear, thus stimulating sufficiently to produce a hyperæmic condition of the drum-head, showing the impression made upon the lining of the middle ear. The effect may be increased by first cleansing the Eustachian tube with warm alkaline solutions as supplemental to the use of the steam atomizer and preceding the use of the iodized air. Since

there are imperfect circulation and imperfect nutrition, even in the hyper-



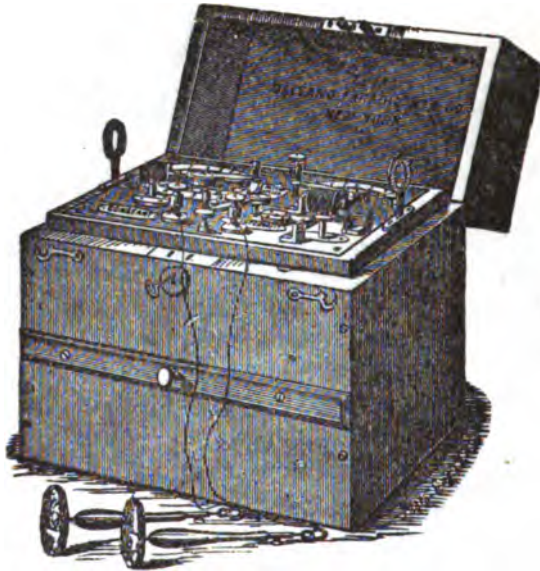
Vertical section of head, showing Eustachian catheter in position.

trophied form, whatever will quicken the circulation and stimulate the parts will have a tendency to restore normal circulation and normal nutrition. For that reason the galvanic current may often be advantageously used, not for an impression upon this nerve of special sensation, but simply to improve the nutrition of the conducting apparatus. Mildly stimulating applications may also be made to the external meatus and to the dermoid layer of the drum-head. Since the parts have been deprived of the protection of the cerumen spread over the surface of the meatus, a substitute for that should be applied, and for this purpose the petroleum



Buttle's inhaler and valve-bulb.

products are among the best. Should the disease of the middle ear have so influenced the dermoid lining of the external ear as to have produced a soil favorable for the growth of parasites, such as aspergillus, some parasiticide should be used. For this purpose solutions



Galvanic battery.

of carbolic acid, of peroxide of hydrogen, and of bichloride of mercury have been applied advantageously. In this state of imperfect circulation of the blood the normal temperature of the middle ear is not maintained. As a consequence, exposure to high winds causes discomfort and greater impairment of hearing and temporarily aggravates the existing difficulty. Therefore some protection, as by wool or cotton, should be introduced into the external meatus, but not habitually used, or the auricle be lightly covered, when exposed to low temperature and high winds.

FIBROUS TUMOR OF THE NASO-PHARYNX.

CLINICAL LECTURE DELIVERED AT THE ABERDEEN ROYAL INFIRMARY.

BY J. MACKENZIE BOOTH, M.A., M.D., C.M. (Aberdeen),

Surgeon and Lecturer on Clinical Surgery at the Aberdeen Royal Infirmary ; Lecturer on Diseases of the Ear and Larynx in the University of Aberdeen.

GENTLEMEN,—I wish to direct your attention to the case of a lad who has been in one of the wards under my care for the last few days.

The case possesses more than ordinary interest as being that of a growth which, though benign in character, has always been justly dreaded from its inaccessibility and its tendency to recurrence ; also from the fact that our modern increased facilities of diagnosis have rendered its early recognition easier, while recent improvements in instruments have enabled us to cope with it with greater success than was possible heretofore.

The subject of this affection is a tall, thin country lad, sixteen years of age, who has of late been growing very rapidly. About four years ago, after being much frightened by the occurrence of a fire in the house where he resided, he was noticed to stammer ; and shortly after, on account of this affliction along with his rapid growth, his medical attendant recommended a reduction in his tale of school work,—after which the stammering was lessened. Only for a time, however, did the improvement last, when the stammer recommenced, and then began the symptoms more distinctly referable to the present ailment. These were symptoms of nasal obstruction, interference with respiration through the nose, first in one and then in both nostrils, and a sensation of discomfort in the nasal cavity,—mouth-breathing, nasal voice, and snoring during sleep,—all of which symptoms gradually increased in severity and grew more constant as time passed. There was a mucopurulent secretion both from nose and mouth, necessitating oft-repeated efforts at hawking and spitting ; and the breath acquired a somewhat disagreeable odor, though it could not be called fetid. His speech became so thick as at times to be almost unintelligible. Of late months another and very characteristic symptom has appeared,—viz., bleeding,

generally as hæmoptysis, though occasionally epistaxis has been present. This symptom has been very variable, occurring at irregular intervals and varying in the amount of blood lost, but coming on more especially after any violent exertion. Its profuse occurrence a few days since, while he was acting as a beater to a cover shooting-party at which his medical attendant was present, led to his being sent to the Infirmary for treatment. During the last few months deafness has become a prominent and distressing symptom, getting gradually more marked up to the present time. Latterly, also, his friends noticed some flattening and broadening of the bridge of the nose, and the nasal obstruction became much more complete, so that no amount of blowing could clear it, and he had to keep his mouth open in order to breathe, and even then there was some dyspnoea. This was more noticeable during sleep, which had become more disturbed in consequence,—the breathing getting sometimes obstructed and the patient becoming blue in the face before he awoke and began to breathe again. The snoring had become louder than before, and the patient constantly groaned and tossed from side to side during his troubled sleep. For a short time back, too, his friends said, he had some difficulty in retaining his urine. So that altogether, as you can see, the patient arrived at the Infirmary in a pitiable plight. So far as I have been able to ascertain, the only interesting points in the family history are the removal of a mammary tumor from his mother, and the death of his maternal grandmother from a cancerous growth.

On his admission to the hospital the patient's appearance tallied exactly with the history we had received, and you could see at a glance the silly expression so characteristic of nasal obstruction and the consequent deafness. Otherwise the lad seemed intelligent enough.

Physical examination elicited the following particulars. On inspection of the mouth with the tongue depressed, the soft palate was seen to be pushed down into the mouth and somewhat stretched, convex instead of concave, with the convexity extending into and greatly diminishing the capacity of the mouth and pharynx. Just below the free margin of the velum could be made out a red swelling intervening between the velum and the posterior pharyngeal wall. Digital examination of the pharynx could hardly be borne even with the aid of cocaine, and revealed merely a hard, dense, globular swelling filling the vault of the pharynx and very slightly movable on pressure. Its relations with the surrounding parts it was impossible to discover, though it seemed to be inseparable from the soft palate. A palate-retractor could not be introduced, and only by pulling on the uvula with

a pair of dressing-forceps could a little more of the swelling be exposed to view. There was not room for the rhinoscopic mirror between the tongue and the swelling, and no further information could be obtained from the employment of anterior rhinoscopy. In order to examine the case more fully, and in view of a consultation with my colleagues,—for I thought it probable that a somewhat extensive preliminary operation would be necessary to get at the growth,—chloroform anæsthesia was determined on. This was no easy matter, on account of the impeded respiration; but, in the absence of the regular anæsthetist, it was skillfully managed by the house-surgeon, Dr. Mathieson, who at the same time kept the tongue out by means of a Liston's forceps applied to its tip. When anæsthesia was complete, the finger could be passed along between the velum and the tumor, which seemed to be springing from the left side of the vault of the pharynx, to which it was attached by a strong tough stalk. Owing to the difficulty of anæsthesia and the urgency of the patient's condition, I resolved to attempt the immediate removal of the growth. Of the instruments available, the one I selected as most likely to suit my purpose was a Koeberle's *serre-nœud* armed with a strong steel wire. The loop of wire was with some difficulty passed through the left nostril into the pharynx, where the left forefinger pushed it over the body of the tumor and as close as possible to the point of attachment. Then the loop was tightened and an attempt made to cut through the pedicle. This was not so easily done as I had anticipated, for, though the screw was very gradually tightened, so resistant was the tissue that the strong steel shaft of the instrument was bent like a bow, and I feared that the wire would give way. When it was nearly cut through, a volsella was introduced by the mouth, and the fundus of the tumor firmly grasped. As soon as the pedicle was fairly divided, traction was made on the volsella and the tumor removed through the mouth. Rather profuse bleeding ensued through the nostrils and mouth, so by means of a Bellocq's canula a plug of lint previously prepared was introduced into the posterior nares in the usual manner. The tumor was a very dense, ovoid, slightly flattened mass, weighing about one ounce after removal, and evidently composed of dense fibrous tissue, having a deep notch where it had been pressed on by the posterior edge of the septum, and being flattened where it had been in contact with the posterior pharyngeal wall and the upper surface of the palate. The accompanying illustration, made from a photograph, shows the exact size of the tumor in the position it occupied in the naso-pharynx, its attachment, and the details of conformation above mentioned. The plug was removed on the day following the

operation, and the nares irrigated daily with a warm saturated solution of boracic acid.

The result so far has been exceedingly satisfactory. The respiration was immediately relieved, and the first night, notwithstanding the presence of the post-nasal plug, the breathing was undisturbed and the snoring almost gone. I may here mention that the lad had to be put into a separate ward on account of the disturbance of the other patients by his extraordinary snoring. The voice has lost its nasal character to a great extent, the deafness is already less marked, and the patient's general condition is vastly improved. There is, indeed, marked paresis of the soft palate, due to the long-continued pressure, more especially on the left side; but daily improvement has been noted since the opera-



x, x, x mark base of attachment; p, projection into the right nasal passage; s, mark of septum; fs, flattened surface pressing on posterior pharyngeal wall; ls, lower surface pressing on velum and causing bulging in roof of mouth.

tion, and with its disappearance we may confidently hope for a corresponding improvement in the voice and, though perhaps to a lesser extent, in the hearing power. The power of swallowing has been almost entirely regained already, and this will be aided by the improvement in the muscular condition of the velum. The stammer to which the patient has been subject for several years seems to have been independent of the naso-pharyngeal growth, though the boy's relatives say it is not so pronounced as formerly.

In the consideration of this case, the outlines of which I have given, there are several points of considerable interest apart altogether from its comparative rarity. This affection is admittedly rare, though it seems to be of more common occurrence in Continental clinics than in our own. With reference to the diagnosis, the presence of hemorrhage following prolonged nasal obstruction, with a hard, smooth, rounded mass in the pharyngeal vault, occurring in a young man, was strongly suggestive of fibrous tumor. These tumors always occur in males from twelve to twenty-five years of age, as has been pointed out by various writers, at the time when many of the more important fibrous

structures undergo their principal development ; and Nélaton has shown that in most instances they primarily spring from a limited area of the periosteum covering the basilar process of the occipital bone or the body of the sphenoid. It has been generally considered that heredity does not play any part in the production of these tumors ; but in the case before us there is a distinct history of a tendency to tumor-formation. The attacks of hemorrhage and the hardness of the growth excluded the diagnosis of ordinary mucous polypi, and, coupled with the age and sex of the patient, pointed to the likelihood of a fibrous rather than a sarcomatous or other malignant growth. This proneness to hemorrhage is an almost invariable symptom, and the bleeding is sometimes so profuse as to endanger the life of the patient. The occurrence of deafness is usual in these cases, as in most nasal affections in the neighborhood of the Eustachian orifices,—at first the effect of simple blockage of the tubes, and afterwards of catarrhal inflammation of the tympanum resulting from this.

As you will doubtless find in many of your cases in after-practice, the production of anæsthesia greatly facilitated the diagnosis, and enabled us to devise and carry out a suitable method of treatment.

In such cases as this it is necessary to give a very guarded prognosis. It has been shown that up to twenty-five years of age these growths are very liable to recur, and that the younger the age at which they appear the graver is the prospect,—statistics which are not very reassuring in a case like the one before us, where the patient is but sixteen years of age. Consequently, it behooves us to warn the lad's relatives of the danger attending this condition, and of the necessity of careful supervision for several years to come.

The question of the treatment of the case was also interesting. From the symptoms, the duration, the hardness and the size of the growth, I thought that a rather formidable preliminary operation, such as a resection of the upper jaw, would be necessary to get at the tumor ; and had the case been somewhat more advanced, such an operation would certainly have been required. The modern treatment which is most admirably adapted for these tumors when they are recognized sufficiently early, as they can often be with the rhinoscopic mirror, is unquestionably their removal by means of the galvano-caustic snare. But, though this was in readiness in the operating-theatre on the occasion referred to, the size, toughness, and resistance of the pedicle were such as to render its employment useless. Accordingly, I had recourse to a much stronger instrument, the *serre-nœud*, which is, as you know, generally used for a different purpose ; and even its strong steel wire

was exposed to a considerable strain before I managed to cut through the thick fibrous pedicle of the tumor.

The after-treatment is also of importance. Regular daily antiseptic irrigation of the nares till the *écraseur* wound has healed, which along with occasional inflation of the tympanum will also benefit the aural affection, has been enjoined. Massage, and the application of the faradic or galvanic current to the muscles of the soft palate, will be desirable in order to improve the voice and swallowing power, together with such hygienic measures as will benefit the patient's general condition. And lastly, and most important of all, a careful watch must be maintained for several years, so that, should there be any appearance of the neoplasm, early treatment may be undertaken with a good prospect of success.

Dermatology.

RINGWORM; PEDICULOSIS AND SCABIES; ECZEMA; PSORIASIS; EPITHELIOMA.

CLINICAL LECTURE DELIVERED AT THE WOMAN'S MEDICAL COLLEGE OF THE NEW YORK INFIRMARY.

BY GEORGE THOMAS JACKSON, M.D.,

Professor of Dermatology.

RINGWORM.

HERE is a little girl who has two circular patches upon the left side of the neck. They are scaly, of a rather pale red, and have a well-marked elevated border. Their central portions are beginning to clear up, and look as if depressed. They are therefore ring-shaped patches. We also notice that the child has enlarged glands in the neck.

What are the eruptions that occur as circles or rings? It is well, for diagnostic purposes, to group in your minds the various dermatoses according to form, distribution, or some specially-pronounced symptom. Here the most striking element is the circular shape of the lesions, and we remember that erythema multiforme, psoriasis, pityriasis rosea, syphilis, and ringworm are all apt to occur as ringed eruptions.

Is this a case of erythema multiforme? No: because we have not a simple redness that fades away under pressure, to return again when pressure is removed. In this case the border is not only raised, but also decidedly scaly, and if you press upon it you will leave a yellowish stain that soon assumes the red color again. Besides, the eruption occurs on the neck alone, and not on the forearms and backs of the wrists, where an erythema multiforme would be quite sure to appear.

Is it psoriasis? Although the color is somewhat like that of psoriasis, and the patch is scaly, that is about as far as the resemblance goes. It is a localized and not a general eruption; the elbows, knees, and scalp are all spared, locations where we should find lesions were the case one of psoriasis.

Is it pityriasis rosea? Here, again, the limitation of the disease to one locality throws out the diagnosis of pityriasis rosea. In that disease we find, especially on the trunk, dozens, perhaps scores, of rings and oval lesions which are slightly scaly. These do not clear in the centre, but present a wrinkled condition of the epidermis, looking like old parchment, appearances that are wanting here.

It is said that syphilis must be considered in every diagnosis, it is so protean a disease. There is a form of syphilis that looks somewhat like the eruption under consideration. It is known as the circinate syphilide. While it might occur in a child of this age, it practically is so rare a lesion in children that it should not be given much prominence in the diagnosis. Moreover, the light color of these lesions, the evidence of scratching that we find, and the superficial character of the whole affair, are against syphilis. Syphilides have a dark-red color, are not itchy, and present an infiltrated edge.

Having thrown out the other circinate eruptions, we have left the diagnosis of ringworm. This diagnosis we readily make directly and not by exclusion, because we know that ringworm of the body occurs in the form of superficial, scaly, light-red, round or ring-formed patches that itch slightly. So, then, we have established the diagnosis of the patches on the neck: they are ringworm.

But why should there be these enlarged glands in the neck? Whenever you find glands like these in this child's neck, you should first think of the possibility of there being some inflammatory disease of the scalp, as such diseases are always accompanied by enlarged lymphatic glands. If you should find an eczema capitis, look out for pediculi, as they very commonly are the cause of the eczema. Remember that pediculi are found most easily and abundantly on the occipital and temporal regions of the scalp. The most cursory examination of the scalp in this case shows abundant nits in the favorite regions, and more or less eczema. So the child has both trichophytosis corporis and pediculosis capitis.

Up to this year, it was thought and taught that there was but one trichophyton fungus, and this gave rise to both ringworm of the scalp and ringworm of the body. Sabouraud, of Paris, has upset all this. He has made extensive studies of the disease, and you will find a series of papers by him, on the subject, in the *Annales de Dermatologie et de Syphiligraphie* for 1893. It seems to me that his work is the most important of the year. He teaches us that we have no longer a single trichophyton fungus, but a number of them. He has found that the variety that causes ringworm of the scalp always breeds true,

and has small spores. This he names the "trichophyton microsporon." It is the one most constantly found in the ringworm of the scalp that proves so obstinate to treatment. He has also found another variety constant in ringworm of the body, and sometimes found on the scalp. If it occurs on the scalp, the ringworm caused by it is easily cured. Now, we knew, by clinical experience, that there were some cases of ringworm of the scalp which were easy of cure, and others that were very obstinate to treatment. Sabouraud's discovery throws new light upon the subject, and explains the reason why. This second form of fungus has large spores and is named by its discoverer the "trichophyton megalosporon." This large-spored fungus is the one that occurs especially in animals, and has many varieties, one being apparently peculiar to horses, another to cats, another to fowls, and so on.

The case now before us is due to the trichophyton megalosporon, and has probably been derived from some animal. Ringworm is very common in horses, dogs, cats, and other domestic animals. Whenever you find a ringworm in a child, always institute a search of the child's pets. You will frequently find a cat with the hair off its legs, scaly skin, and a generally distressed look.

It is usually as easy to cure ringworm of the body as it is to recognize it. There are nearly as many ringworm cures as there are wart cures, and they are many. You can cure ringworm by almost any antiparasitic application, such as sulphur ointment, painting with tincture of iodine, chrysarobin, or bichloride-of-mercury solution, two grains to the ounce. The objection to the iodine and the chrysarobin is that they both stain the skin. The old women cure cases by the application of common ink, or of vinegar in which an old-fashioned copper cent has been soaked.

SCABIES; PEDICULOSIS CAPITIS.

This little boy has a general eczema of the pustular variety, the pustules forming patches. We note that the crusts are rather greenish. On the neck there are many pustules. We know the disease is itchy, because we see the scratch-marks. It is a pustular eczema, but we must find out if there is anything behind the eczema. We see the hair has been cut off, and that there are large crusts on the scalp. These crusts are always suggestive of pediculosis. We think also of scabies and of urticaria, because those are itchy eruptions, and when they occur over the body pretty generally are apt to cause an artificial eczema. In this case the hands are very much implicated, and we are sure there is something besides pediculosis, because that

does not affect the hands. We also notice that the prepuce is swollen and has upon it a number of scratched lesions.

Whenever you find the penis so much affected as in this case, you may be quite sure that you have scabies to deal with. This is a very important point, because often you will examine a patient all over, and he will show scarcely any decided symptoms of scabies, but if you find the genitals are affected, as in this case, you may suspect scabies. That this child has *pediculosis capitis* we know from the location of his eczema on the occipital region and by finding nits on the hair. That he has not *pediculosis vestimentorum* we know, because the eruption here does not occupy the typical location for that form of the disease, that is, over the shoulders and on the outer and inner aspects of the limbs where the seams of the clothing come, and over the buttocks, which is very common, and around the waistband.

On the other hand, scabies occurs on the anterior face of the wrist, between the webs of the fingers, around the umbilicus, and on the genitals of the male and the breast of the female. It is also apt to affect the axillæ, and this child has it quite well marked in that location. Scabies never occurs upon the face, but you may have an eczema on the face with scabies, which is sympathetic. The eruption consists of excoriations, pustules, and eczematous patches. Another diagnostic sign of scabies is the furrow, which is often hard to find. Our patient has therefore two diseases,—*pediculosis capitis* and scabies. This is the second case to-day with more than one skin-disease.

To cure scabies is easy if you recognize it. Never be content with the simple diagnosis of eczema until you are sure that you have excluded scabies and *pediculosis*. Sometimes cases of scabies will be treated by the physician for months under the mistaken diagnosis of eczema. Oxide-of-zinc ointment won't cure scabies. Perhaps as efficient a remedy for its cure as any is sulphur ointment. The patient is directed to take a warm bath and scrub his skin thoroughly with soap. He is then to dry the skin with a coarse towel, and rub in sulphur ointment. He is to rub in the ointment each morning and evening for three days, and then take another bath and report to the doctor. Perhaps a second course of treatment may be necessary for a cure. Two courses are almost always enough. At the end of the second course it is always best to suspend treatment for a few days and use only vaseline and corn-starch to the skin, even though itching is still complained of, because sulphur will at times set up an eczema of its own that will be itchy. In small children balsam of Peru will be as efficient as sulphur, and is less objectionable to the attendants.

ECZEMA.

Eczema is the most important of all our skin-diseases. There are six cardinal signs of eczema,—namely, redness, itching, infiltration, moisture, crusting or scaling, and cracking.

This boy has an eruption on the skin. You can see that it itches; you will also notice that it forms patches, and that these patches are not definitely shaped, and have no particular outline. If you look at his right arm, for instance, it would be very hard for you to draw a picture of the outline of the patch on the blackboard and say where it began and where it ended. The skin feels harsh and dry, and also thickened. If you take up a fold of the diseased skin, and then one of the sound skin, you will appreciate that there is a difference in the thickness of the skin. The patches are red. The disease seems to be quite a dry one, but you see a number of lately-torn-off little crusts with excoriated points, and, looking at it closely, you can see here and there the shining of a vesicle, showing that there is a tendency to moisture. So we have here redness, itching, infiltration, and a tendency to moisture. You can see also a certain amount of both scaling and crusting. There is no cracking, because the disease is not located where cracks occur,—that is, it is not over the joints.

This is an excellent illustration of a case of eczema. What sort of eczema shall we call it? There are a variety of eczemas put down in the text-books: which is this? It is sufficient for us to know in the first place that it is an eczema; and after that to know whether it is acute, subacute, or chronic. These are the important points so far as the cure of the case is concerned.

Behind the ears we find little scaly patches. Recollect that behind the ear is the place where eczema is very fond of retiring. A scaly patch behind the ear is indicative of eczema, while one in front of the ear suggests psoriasis. Now, as to treatment. The case is at least subacute, as we find no evidences of much activity. Choose your treatment from what you see, not from the length of time the disease has lasted. We may have an acute outbreak upon a chronic eczematous patch. Remember that in an acute eczema you should use the mildest possible remedies, such as lime-water, or vaseline and corn-starch; in subacute cases astringents and protectives are in order, such as oxide-of-zinc ointment, Lassar's paste, and diachylon ointment. Still later, when the squamous stage is reached, and there is more or less thickening of the skin, we should use stimulating treatment, and our most usual stimulant is some form of tar, especially the oil of cade in the strength of

from twenty drops to the ounce up to a drachm or more. In the present case we can use an ointment composed of a drachm of the oil of cade to an ounce of oxide-of-zinc ointment.

PSORIASIS.

Here is a young girl with psoriasis. Whenever you find this eruption it is always the same. It always appears in the form of light-red, slightly elevated patches which are covered with scales, no matter what the size of the patches may be. When we scrape off the scales there is exposed a smooth shining surface which will soon have on it little red points, caused by oozing of blood from the ruptured capillary vessels escaping through the mucous layer of the epidermis. This is a sign of psoriasis that is regarded by some as pathognomonic. To produce it you must take a spot that is a rather fresh one. This patient presents the papular, punctate, and nummular forms of the disease. She has no patch in front of the ear. Another common location for psoriasis is along the edge of the hair on the forehead; and that is also absent in this patient. The extensor surfaces of her arms and elbows have patches on them; there are also a few on the flexor surfaces of the arms, and some on the legs.

Most cases of psoriasis occur early in life. It is rare for it to begin in old age. This patient is eighteen. You will notice that the patches are scaly and dry, and that the outlines are easily marked. This is one very striking difference between eczema and psoriasis. In eczema there is thickening of the skin; here it is not so marked. Here there is never moisture nor a tendency to it; in eczema there is always moisture or a tendency towards it. These lesions have been scratched somewhat, which shows that the disease is slightly itchy.

The latest remedy in the treatment of psoriasis is thyroid feeding. The best method of using the thyroid is probably the glycerin extract. This has not yet been put on the market. There is a preparation of desiccated thyroids, made by Parke, Davis & Co., and this is the one we shall use here. The extract made from the thyroids of lambs is supposed to be more active than that made from sheep's thyroids, and to be less likely to cause rise of temperature and other untoward symptoms.

EPITHELIOMA.

Here we have a lesion on the nose of a woman who is past middle life. Whenever you find a lesion on the face, which is isolated, hard, and either crusted or ulcerated, in a person who is past middle life, and which has lasted some time, you can be sure that it is epithelioma.

This particular lesion, if left to itself, its crust not picked off, would probably go on to the formation of a cutaneous horn, which is often seated upon an epithelioma as a base. Sometimes these excrescences stand out several inches from the face, and look like the horns of cattle. This patient picks at the lesion all the time, removing the crust, and the growth grows deeper and deeper. It has not yet grown very deep. It bleeds very easily. You will note the cartilaginous-looking border and the dilated vessels running over it,—pathognomonic symptoms of epithelioma.

The way to treat it is to remove the crust and scrape away all the growth with a dermal curette. There is no danger of going too deep, as the curette will not attack sound tissues. The chances are that this scraping alone will not be enough to cure it, so we shall have her use a thirty-three-and-one-third-per-cent. ointment of pyrogallic acid for five or ten days, to encourage suppuration, and then wear a piece of mercurial plaster, under which it will heal. In most cases this will permanently destroy the growth. If a relapse takes place,—and epithelioma is prone to relapse,—as soon as the hard point appears it will be a simple matter to scrape it out and destroy it with pyrogallic acid.

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END OF VOLUME I.

TROMMER MODIFIED MILK PROCESS.

BY THE USE OF
TROMMER DIASTASIC EXTRACT OF MALT.

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TROMMER MODIFIED MILK

is free from the above objections, it being easily and economically prepared by nurse or mother, gives it a wide range of usefulness among all classes; it possesses all the advantages of a perfectly predigested food or peptonized milk, with none of the disagreeable features of the latter. The danger from stale or "shop-worn" infant food is entirely avoided, better results are obtained and money is saved.

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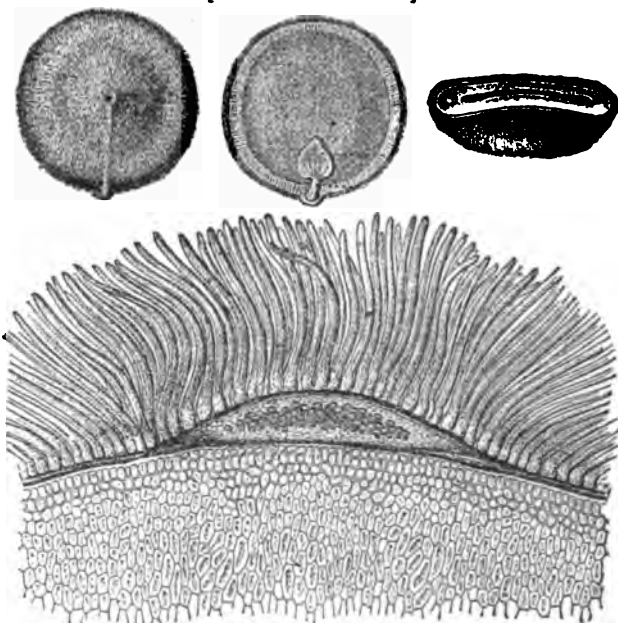
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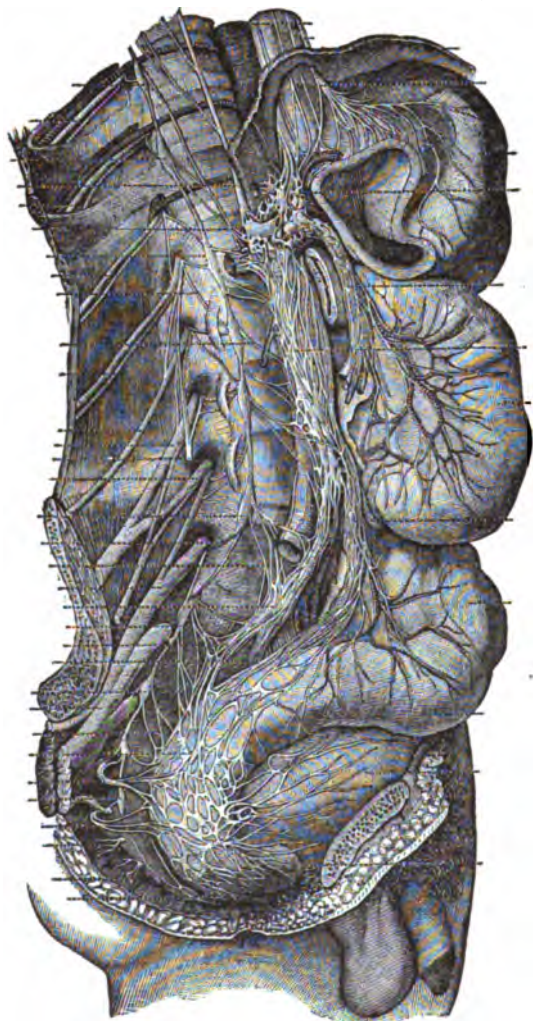
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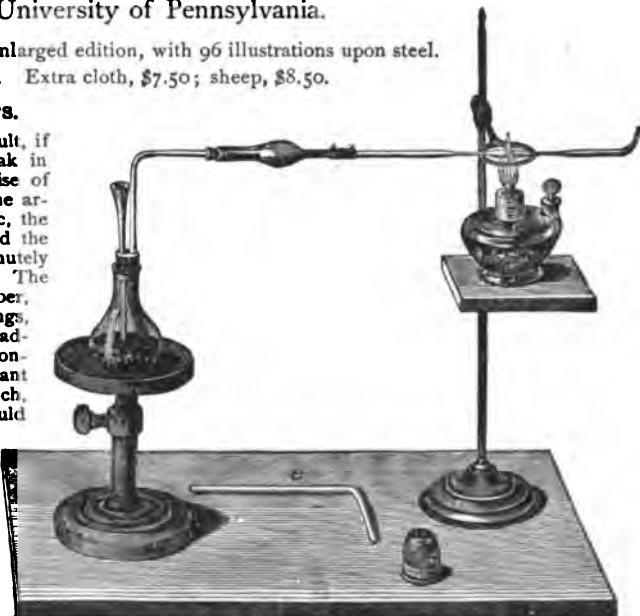
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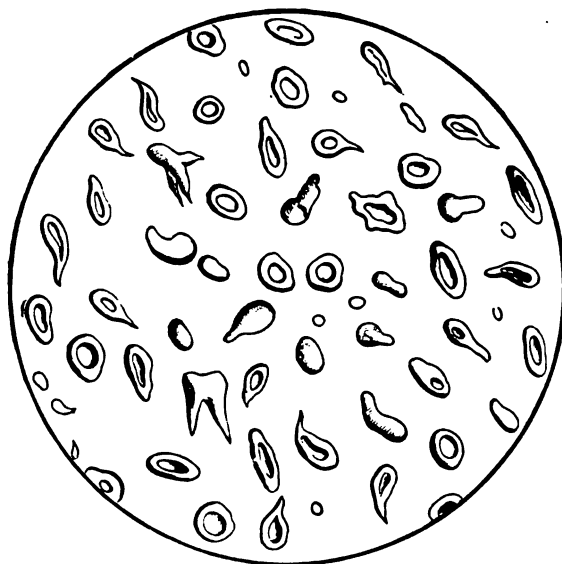
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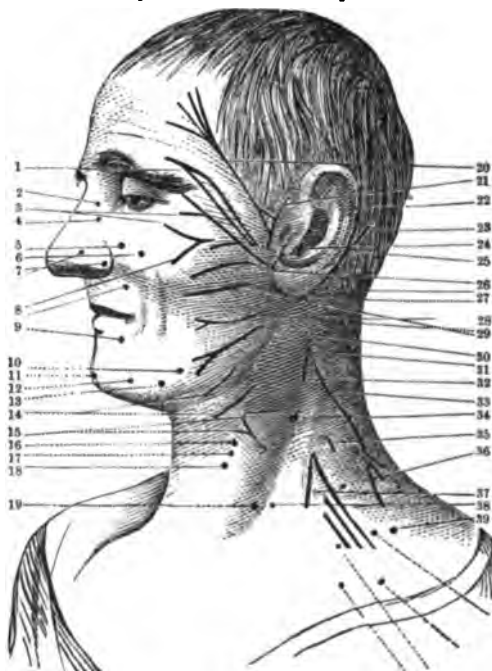
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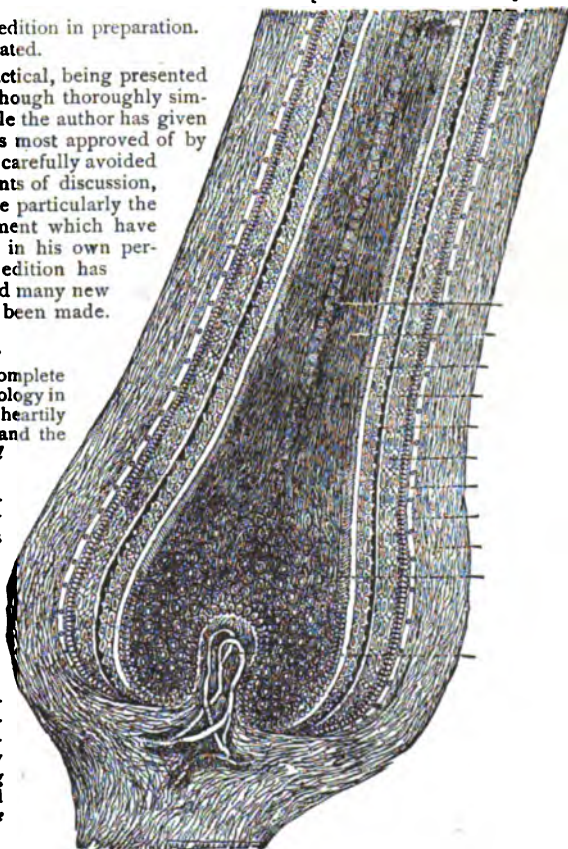


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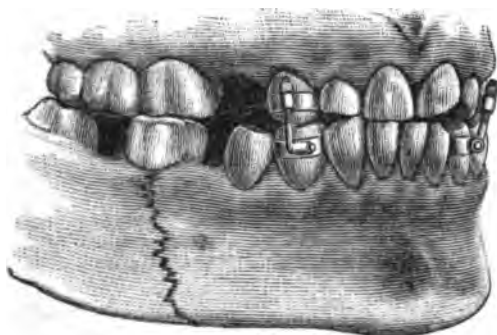
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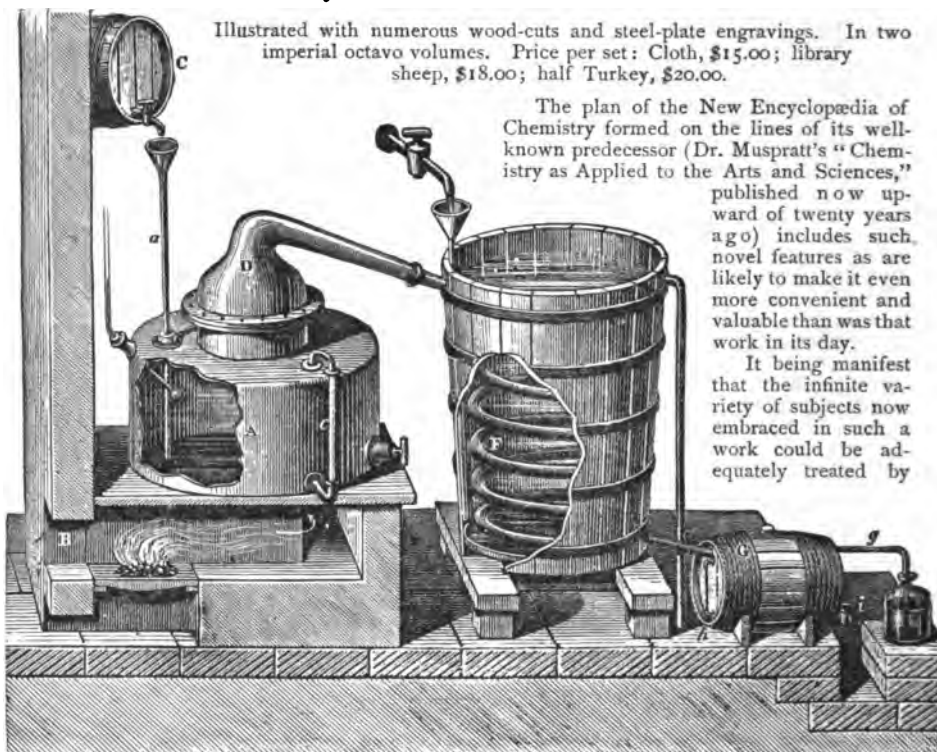
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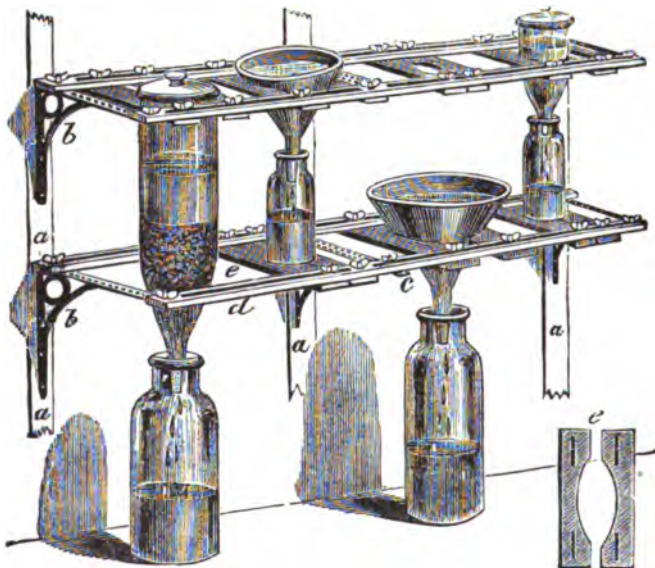
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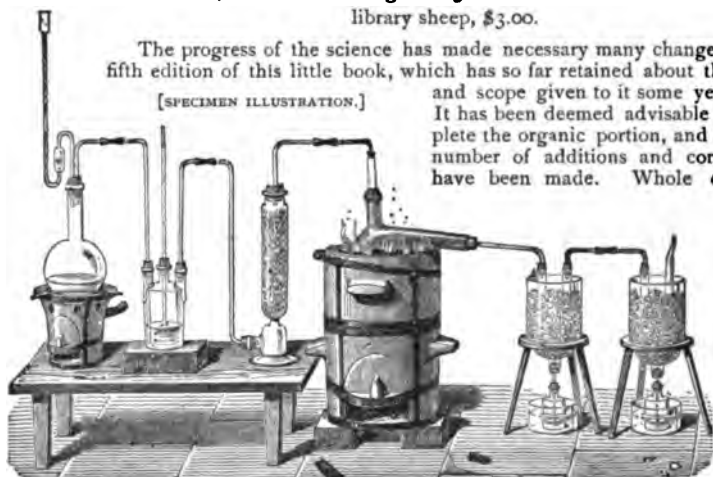
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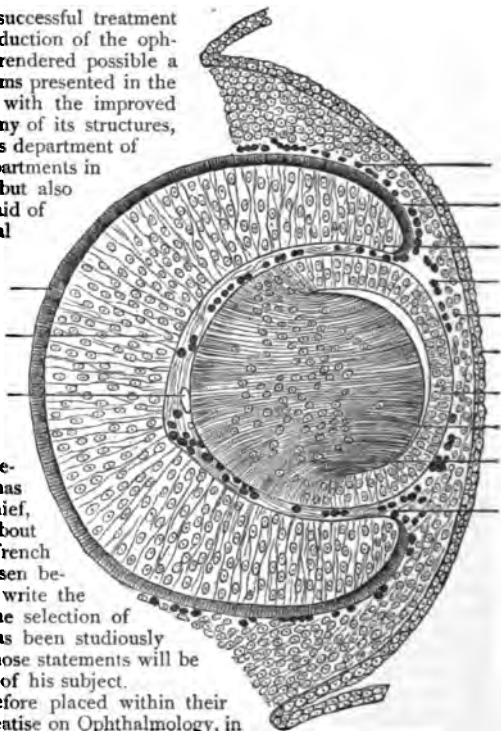
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